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Dr. Impey mentions th ugs to the number of ninety are found perfect stitutes for those employed in Europe. Th llowing are the better known.

Catechu, ...	Acia catechu.
Aconite,........................	Aonitum ferox.
Sweet flag, ...	Arus calamus.
Bael fruit,......................	Agle marmelos.
Mutty pal.	anthus malabaricus.
Aloes, ...	les indica.
Galanga root.	inia galanga.
Lemon Grass, or Citronelle,	dropogon citratum.
Roosa Grass,..............	calamus aromaticus.
Prickly poppy, ...	gemone Mexicana.
ndian Birthwort,........	istolochia indica.
Dhak kino.	tea frondosa.
ndian hemp, ...	nnabis sativa.
Senna leaves,...,.............	ssia senna.
Purging Cassia,...............	Chartocarpus fistula.
	Cretta.
Clitorca, ...	Corea ternatea.
	Cculus Indicus.
	Chicum.
Croton seed, ...	Con tiglium.
Colocynth, ...	Cumis colocynthis.
Thorn apple,..................	Dara stramonium.
Foxglove, ...	Dtalis purpurea.
Borneo Camphor,...........	Dabalanops camphora.
Gamboge, ...	Gainia pictoria.
Dikkamully gum, ...	Gaenia lucida.
Bonduc nut,..................	Gundina bonduc.
Chaulmoogra.	Gycardia odorata.
Country Sarsaparilla, ...	Heldesmus indicus.
Hydrocotyle,............... ..	Hrocotyle asiatica.
Henbane, ...	Hyeyamus niger.
	Juner Berries.
	Kret.
nseed,.........................	Linu usitatissimum.
Chiretta, variety of, ...	Ophia elegans.
ssafœtida, ...	Nartex assafœtida.
pium, ...	Papar somniferum.
ebs,.........	Pipenubeba.
ack pepper, ...	Pipenigrum.
ndian Leadwort, ...	Plumgo zeylanica.
ree kino,...................	Pterocpus marsupium.
omegranate Rind, ...	
hubarb.	Himalas and Tibet.
astor Oil, ...	Riciun Communis.
ifferent sorts of Galls, ...	Terminlia catappa, and other species.
ountry Ipecacuanha, ...	Tylophra asthmatica.
arsaparilla, ...	Smilax.
ux vomica, ...	Strychns nux vomica.
learing nut	Strychns potatorum.
onessee bark, ...	Wrighti antidysenterica.

M. E. of 1857.

The Tenasserim Provinces are rich in medicinal lants, both in number and quality. Lindley's ora Medica contains descriptions of all the own medicinal plants in the world, and more n a tithe of the whole number may be seen owing on the Tenasserim coast. Were we derved of European drugs, and left to our own sources; we could find good substitutes for alst every article in the Medical Flora. Besides ose to which separate paragraphs have been otted, the bark root of the red cotton tree, and e roots of the clitoria are emetic; and the root *Tylophora vomitoria* has been pronounced by dian practitioners not inferior to ipecacuanha for any of the purposes to which that medicine is applied. *Cassia fistula* pods, the chebula fruit, the root of the heart seed, the seeds of the Sapodilla, Otaheite gooseberry, and physic nut are aperient or purgative. The gum of the white cotton tree, the bark of *Wrightia antidysenterica*, and the peel of the mangosteen are prescribed in bowel complaints. The green fruit of the papaya, the root of the Persian lilac, and the fruit of the Rangoon creeper are vermifuges. The bitter roots of *Sida acuta*, and *Tephrosia purpurea*, and the seeds of the musk-mallow or musk plant, are deemed cordial and stomachic, and the bark of *Guilandina Bonduc*, is considered a good substitute for cinchona where that cannot be had. The decocted leaves of the goat-footed ipomœa are used as an external application in cholic. The leaves of *Vitex trifolia* are applied in diseases of the spleen. The bark of the white plumbago root will raise a blister, it is said, almost as quickly as cantharides. The oil of the cashew nut "has been used successfully in ring-worms, cancerous ulcers and corns." The mango tree exudes a large quantity of gum-resin resembling bdellium, and an indigenous pine can furnish any quantity of turpentine. The bark of the root, the leaves, and the fruit of the Bengal quince, are as popular with the natives, as the root, bark, flower, and fruit of the pomegranate, which have been famous for their medicinal properties ever since the days of Celsus—*Mason.*

(5255) MEDICAGO (from Μηδική, the Greek name of one of the species), a genus of Plants belonging to the natural order *Leguminosæ*, to the tribe *Loteæ*, and the sub-tribe *Trifolieæ*. It has the calyx somewhat cylindrical, 5-cleft, the keel rather removed from the vexillum; the stamens diadelphous; the legume many-seeded, of various forms, reniform, falcate, or cochleate, but usually twisted in a spiral manner. The species are herbs or shrubs, with the stipules usually cut; the leaves trifoliate, the leaflet usually toothed, and the peduncles 1-2-many flowered. They are exceedingly numerous, upwards of 80 species having been described.—*Eng. Cyc.*

(5256) MEDICAGO SATIVA, Lucerne has many flowered racemes; the pods compressed, spiral, with two or three turns, downy, unarmed; the pedicels shorter than the calyx or bract; the leaflets obovate, oblong, dentate above, emarginate. This plant is a native of Europe, and is found wild in England and Scotland. It has an erect stem, with yellow or violet flowers. It is commonly cultivated in the fields of Europe, and Babington says that "the wild specimens found are scarcely naturalised." This is the Μηδική of Theophrastus, 'Plant. de Caus.' lib. 2, cap. 20; and the *Medica* of Pliny, lib. 2, cap. 20; and the *Medica* of Pliny, let, 18, Cap. 20.—*Eng. Cyc.* Lucerne is cultivated in the Deccan for feeding horses, also in Goozerat, where it is coming fast into use among the natives as green food for cattle. Propagated by seed: may be sown at any season, in beds or rows. It requires much water, and each plant should have five or six inches of space allowed to it. Cultivators generally cut it, as it begins to blossom, when fresh shoots spring up, and a succession of crops is continued in this way for several months, by manuring it occasionally.—*Riddell.*

(5257) MEEAN MILILE. A very hard, fine, close grained, heavy Ceylon wood.

(5258) MEERSCHAUM, a Mineral belonging to the series of Silicates of Magnesia. It is dull-white, opaque, and earthy, nearly like clay. Its hardness is 2·0, and specific gravity 2·6 to 3·4. A variety from Anatolia, analysed by Thomson, gave—

Silica, ...	42 0
Magnesia, ...	30·5
Water, ...	23·0
Lime, ...	2·3
Alumina, ...	2 0
	——99·8

When heated it gives out water and a fetid smell, and becomes hard and perfectly white. When first dug up it has a greasy feel, like soap, and on this account is used by the Tartars in washing their linen. It is known in Europe from its being made use of in Turkey to make the bowls of tobacco-pipes, which are hence called meerschaums. These pipes are first imported into Germany, where they are softened in tallow and wax, and then polished. *Aphrodite* and *Quincite* appear to be varieties. (Dana, *Mineralogy.*)—*Eng. Cyc.*

(5259) MEETHEE. TRIGONELLA FŒNUM-GRŒCUM. Fœnugreek. This is a small annual, commonly cultivated during the cold season. The greens are used by the natives and the seed in curries. It is sown like all other common greens. —*Riddell.*

(5260) MEETHEE KUDHOO. CUCURBITA PEPO. Sweet Pumpkin. This is grown at the same time as all the other species, and if hung up in a dry place is an excellent store vegetable, keeping for several months.—*Riddell.*

(5261) MEGACHILE. The nest of the leaf-cutter bee is to be found in thousands in the cliffs of the hills of the Soane valley with May-flies, Caddis-worms, spiders, and many predaceous beetles.—*Hooker Him. Jour. Vol.* 1. *p.* 52.

(5262) MELALEUCA (from μέλας, black, and λευκός,, white), a genus of Plants belonging to the natural order *Myrtaceæ.* It has the calyx-tube nearly hemispherical, the limb 5-partite; the petals 5; the stamens numerous, combined into 5 elongated bundles, which alternate with the petals; the anthers incumbent; the style filiform, the stigma obtuse; the capsule cannate with and inclosed in thdhicned tube of the calyx, which is sessile on nddnate at its base to the flower bearing brano, celled, many-seeded; the seeds angular. Tie pecies are trees or shrubs with alternate o posite entire leaves, equal at the base, with flvers perfectly sessile, or somewhat combined w the branch, arranged in spikes or heads, anbf a white, yellowish, or purplish colour.—*EnCyc.*

(5263) MELALEUC CAJUPUTI, (Roxburgh), *M. minor* (Smi, *Melaleuca Cajuputi,* Roxb. (fig. 64), forma small tree with an erect but crooked stem ecred with thick, rather soft, light-coloured ba branches scattered, with slender twigs wh droop like those of the Weeping Willow. aves alternate lanceolate, acute, slightly fate, 3 to 5 nerved, while young silky, a diffusing a powerful odour when bruised. ikes terminal and from the extreme axils, doiy as well as the calyx and branchlets, while flower there is only a scaly conic bud athe apex, which soon advances into a leafybranchlet. Bracts solitary, 3 flowered. Caly urceolate, (fig. 64, 3,) limb 5 parted. Petal5, white, scentless. Stamens from 30 to 40, five bundles; filaments 3 or 4 times longer th petals. Anthers incumbent with a yellow gnd at the apex. Style long. Stigma obscuy 3-lobed. Ovary ovate, and like the capsul3-celled, (f. 64. 2 and 1,) many seeded, lowerhalf united with, but the capsule is enclosed whin the thickened tube of the calyx. Seeds agularly wedge shaped. A native of the Molucc Islands, especially of Boerou, Manipe and of te S. of Borneo. It is called *Daun kitsjil,* bt also Cajuputi. The leaves are collected on a warm dry day in autumn, and placed in dry sks, in which they neverthless become heated andnoist. They are then cut in pieces, macerated i water for a night, and then distilled. Two sacfuls of the leaves yield only about 3 drachms o the oil. This is clear and limpid, of a light geen colour, very volatile, diffusing a powerful dour, having a warm aromatic taste, somethig resembling that of Camphor, followed by a sens of coolness. Sp. Gr. 0·911 to 0·927; soluble in Alcohol. It boils at 343°. When distilled with water, a light and colourless oil first comes over, and then a green-coloured and denser oil, which with less odour, is more acrid. Comp. C_{10} H_9 $O=77$. Some adulterations are occasionally practised with this oil, especially at the time when it reached a high price, chiefly with the Oils of Rosemary and of Camphor; but it is now commonly met with in a pure state, and without any admixture of Copper. In its *Action* and *Uses,* it is Diffusible Stimulant, Antispasmodic; externally in Rheumatism. Surprise was excited in India when Cayaputi Oil was stated to be a cure for Cholera, as Oil of Peppermint is as useful. Dose ♏ iij.—♏v. given on a lump of Sugar—*Royle.*

(5264) MELALEUCA. LEUCODENDRON, White-Tree, or Cajeput-Tree, has alternate long lanceolate acuminated falcate 3-5-nerved leaves; the flower-bearing branches pendulous; the flowers in spikes rather distant, which, as well as the rachis, are quite glabrous. It is a native of the East India Islands, and was at one time supposed to yield the oil of commerce. Roxburgh asserts that it possesses little or no frgrance in its leaves, and that it is seldom or nevr used for the distillation of the oil which is sed in the European markets. Upwards of 30 species of *Melaleuca* have been described, the majority of which are natives of Australia. May of them are fine plants with beautiful blossos, and very desirable for the conservatory or reenhouse. They grow well in a mixture of pe loam, and sand, and may be propagated by cungs, which will readily take root if planted in pot of sand and placed under a hand or bell-gls. (Lindley, *Flora Medica*; Don, *Dichlamydeo Plants.*—*Eng. Cyc.*

(5265) MELANORRHÆA, a gus of Plants belonging to the natural order *Anardiaceæ*, so called from the brown fluid witwhich every part of the principal species abnds turning black upon exposure to the air.—*ng. Cyc.* In the Tenasserim Provinces, therre two indigenous species Melanorrhæa gla and M. Usitata, of the same genus that prods the common black varnish; but Mr. Mason, ot aware that the exudation which they yield pplied to any economical purpose.—*Mason.*

(5266) MELANORRHÆA SITATA.

Theet-see, BURM

This is the *Theet-see* or *Lig vitæ* of Pegu. It is plentiful in the Tounghond Prome Forests, especially in the former. is of dark red colour, of extreme closeness oain and density of structure, with a specific gy so great, that it serves in place of iron as hors for native boats. Its great hardness aweight prevent its being employed in house-lding. It would answer for sheaths or blockleys and other purposes connected with maery, where great strength and density are reed. The tree is very common above the parapf Tounghoo and grows to a girth of six feet ark-brown wood. —*McClelland. M. usitata,* ch is familiarly known as the Birmese Varniree, or Theetsee, was not described by botanintil discovered by Dr. Wallich, and figured is splendid work 'Plantæ Asiaticæ Rariores,' and 12. The tribe to which it belongs abounplants yielding a blackish, acrid, and resinuice used for varnishing and other such pus, as the Marking Nut and the Japan Va-Tree. This tree was first seen near Prome is found in different parts of Birma anng the coast from Tenasserim to Tavoy, exng from the latter in 14° to 25° N. lat., as Wallich has identified it with the Kheu onish-Tree of Munipoor, a principality in Hindustan, bordering on the north-east frontier districts of Silhet and Tippera. It grows especially at Kubbu, an extensive valley elevated about 500 feet above the plains of Bengal, and 200 miles from the nearest sea-shore. There it attains its greatest size; some, and those not the largest, having clear stems of 42 feet to the first branch, with a circumference near the ground of 13 feet. It forms extensive forests, and is associated with the two staple timber-trees of continental India, Teak and Saul (*Tectona grandis* and *Shorea robusta*), especially the latter, and also with the gigantic Wood-Oil Tree, a species of *Dipterocarpus*. The Theetsee forms a large tree, with the habit of *Semicarpus*, and abounds in every part with a viscid ferruginous juice, which quickly becomes black by the contact of the atmosphere. Its leaves are large, coriaceous, simple, very entire, and deciduous. The panicles of flowers are axillary, oblong; those of the fruit simple and lax, with very large rufous and finally ferruginous involucres. It sheds its leaves in November, and continues naked until the month of May, during which period it produces its flowers and fruit. During the rainy season, which lasts for five months, from the middle of May until the end of October, it is in full foliage. At Prome a considerable quantity of varnish is extracted from this tree, but very little at Martaban. It is collected by inserting a pointed joint of a bamboo, which is closed at the other end, into wounds made in the trunk and principal boughs, which are removed after 24 or 48 hours, and their contents, which rarely exceed a quarter of an ounce, emptied into a basket made of bamboo and rattan previously varnished over. The collecting season lasts from January to April. In its pure state it is sold at Prome at about 2*s.* 6*d* for about 3½ lbs. avoirdupois. (Wallich.) Mr. Smith, who was long resident at Silhet, and was acquainted with this substance in 1812, states, that it is procurable in great quantities from Munipoor, where it is used for paying rivercraft and for varnishing vessels designed to contain liquids. The drug, he says, is conveyed to Silhet for sale by the merchants, who come down annually with horses and other objects of trade. In Birma, Dr. Wallich states that almost every article of household furniture intended to contain either solid or liquid food, is lacquered by means of it. The process consists in first coating the article with a layer of pounded calcined bones, after which the varnish is laid on thinly, either in its pure state or variously coloured. The most difficult part consists in the drying. It is also much employed in the process of gilding; the surface, being first besmeared with this varnish, has then the gold leaf immediately applied to it. Finally, the beautiful Pali writing of the Birmese on ivory, palm-leaves, or metal, is entirely done with this varnish in its native and pure state. Some difference of opinion exists as to the effects of this juice on the human frame. Dr. Wallich states that it possesses very little pungency, and is entirely without smell, and that both Mr. Swinton and himself have frequently exposed their hands to it without any serious injury, and that the natives never experience any injurious consequences from handling its juice; but he has known instances where it has produced extensive erysipelatous swellings attended with pain and fever. Sir D. Brewster, on the contrary, considers it a very dangerous drug to handle, one of his servants having been twice nearly killed by it. A second species of the genus, *M. glabra*, was obtained by Dr. Wallich from Tavoy. (Wallich, 'Pl. As. Rar.,' i., p. 9, t. 11 and 12; and 'Edinb. Journ. of Science,' viii., p. 96 and 100.)—*Eng. Cyc.*

(5267) MELASTOMA (from μέλας, black, and στόμα, a mouth, because the berries when eaten stain the mouth black), a genus of Plants, the type of the natural order *Melastomaceæ*. It has the tube of the calyx ovate, half-adhering to the ovary, densely covered with scales or bristles; the limb 5- rarely 6-cleft, the segments alternating with the appendages, both deciduous; the petals 5-6; the stamens twice the number of the petals; the anthers oblong linear, a little arched, opening by a pore at the apex, each furnished with a stipe-formed connective, which is in some species elongated and in others short, but always biauriculate or emarginate in front; the free part of the ovarium conical and bristly: the style filiform, somewhat thickened at the apex; the stigma a pruinose dot; the capsule baccate, 5-6-celled, opening irregularly; the seeds cochleate. The species of this genus are shrubs, which are usually covered with strigæ. The leaves are petiolate, and either quite entire or serrulated. The flowers are large, white, rose-coloured, or purple. Between 30 and 40 species of *Melastoma* have been described. They grow in the warmer districts of the Old and New World, and are found in South America, Asia, and Africa. Their flowers are very handsome, and all the species may be cultivated for ornament. They grow well in a mixture of loam, peat, and sand, and young cuttings root freely in sand in heat under a hand-glass. (Lindley, *Vegetable Kingdom*; Don, *Dichlamydeous Plants*.)—*Eng. Cyc.*

(5268) MELASTOMACEÆ, *Melastomads*, an extensive natural order of Polypetalous Exogenous Plants nearly related to *Myrtaceæ*.—*Eng. Cyc.*

(5269) MELASTOMA MALABATHRICUM, Malabar Melastoma, is a shrubby plant with tetragonal branches rough from strigæ; the leaves elliptic-oblong, obtuse at the base, acute at the apex, quite entire, green on both surfaces, and scabrous from strigæ; the corymbs 1-5-flowered; the calyx clothed with adpressed strigose scales, with ovate acute lobes; the connectives of the anthers short, or very long. It is a native of the East Indies, and frequent in the Indian Archipelago. The leaves of this plant are employed by the natives where it grows as a remedy in diarrhœa, dysentery, and mucous discharges.—*Eng. Cyc.* In the Tenasserim Provinces, this species of melastoma with large gaudy purple petals, and long yellow stamens, is a common weed. Its calyx opens like a lid, and bears a fruit which in taste and flavour strongly resemble the blackberry of temperate regions. In Bengal the same plant is cultivated as a garden flower, but it does not compare with the wild plant of Tenasserim.—*Mason.* This is one of the Black-Dye Plant of Asia. The blossoms the shoe-flower plant are used by the Chinese to dye leather black, the juice of the cashew-tree gives a black to linen, and the fruit of this melastoma affords a black dye.—*Mason.*

(5270) MELANIA. Lamarck gives the rivers of the East Indies, Madagascar, the Mauritius, &c., as the locality of *M. amarula*, the animal of which, he says, is very bitter, and passes for an excellent remedy for the dropsy. The apex of all the species is generally eroded as the animal advances in age. Woodward, in his 'Manual,' says, there are 160 recent species. The following are subgenera:—*Melanatria*, Bowdich; *Vibex*, Oken; *Ceriphasia*, Sw.; *Hemisinus*, Sw.; *Melafusus*, . ; *Melatoma*, Anthony; *Anculolus*, Say; *icola*, Anthony; and *Pachystoma* Gray.—*Eng. Cyc.*

(5271) MELIA (so called from Μελία, the Greek name the Common Ash, which one species of the genus is thought to resemble in foliage), a genus of Plants belonging to the natural order *Meliaceæ*, to which it has given its name, and which is, like *Melia*, characterised by having the filaments of the anthers combined into a tube, with the anthers sessile within it, and opening inwards; the seeds without wings. The species are few in number, and chiefly Indian; one is natural in the south of Europe, and one is found in North America.—*Eng. Cyc.*

(5272) MELIA AZADIRACHTA. Lin.

pum marum. TAM.

Flower the Indian azadirachta.

Vaypum poo M.

Neem ka po UK.

Vaympa poo, TEL.

M. Azadira, the Neem-Tree or Margosa-Tree of the peninsula of India, has been separated into a distinct genus on account chiefly of its ternary, not quinary, structure of the parts of the pistil, and its s-seeded fruit. This has been named *Azadira* from the Persian (Azad-i-Durukht, 'the excellent tree'). Its bark is bitter, and considered valuable tonic. The fleshy part of the fruit (like of the olive) yields a fixed oil, which is bitter and considered anthelmintic and stimulant. leaves are universally used in India for poultices, and both the flowers and seeds are irritant and stimulant. According to

Dr. Ainslie, a kind of toddy is procured by fermenting the sap of healthy young margosa-trees. The wood is serviceable, that of old trees is very beautiful and well adapted for furniture, the bark is astringent as well as the leaves, a decoction of which is used as a remedy for itch with effect, the seeds yield a bitter oil which is useful as an external application; the flowers are collected for making a kind of chatun.—*Rohde M.S.S.* In general it is a soft reddish coloured, rather loose textured wood, which however takes a pretty good polish, and is much used for cabinet-making purposes, under the name of bastard cedar.—*Wight.*

(5273) MELIA AZEDARAK, sometimes called Persian Lilac, Pride of India, and Common Bead-Tree (Hill Margosa by Dr. Ainslie), is said by Dr. Roxburgh to be a native of China; it is also a native of the north of India. It is much cultivated in the southern part of the United States of America. It is called Dek in the northern provinces of India, and may be confounded with another species under the name *Azedarach* by Avicenna. When in flower it has some resemblance to the Lilac, and its flowers are very fragrant. The berries are sweetish, and, though said to be poisonous, are eaten by children in the United States without inconvenience, but are reputed to be a powerful vermifuge. The bark of the root in its recent state has a bitter nauseous taste, yielding its virtues to boiling water, and is cathartic and emetic, and considered in the United States an efficient anthelmintic, and also useful in infantile remittents.—*Eng. Cyc.* The Melia Azedarak or Persian Lilac or Hill margosa, *Dek*, flowers in the Botanical Garden of Calcutta during the hot season; it thrives luxuriantly, and becomes a large useful timber tree, of very great beauty. Its flowers are like those of the lilac, and sweetly fragrant. (Roxb. ii p. 395.)—*O'Shaughnessy.*

(5274) MELIA BUKAYUN is distinguished by Dr. Royle from the West Indian *M. sempervirens* of Schwarz, with which it was united by Dr. Roxburgh. This tree appears to be a native of Persia, though common throughout India. It is called by the Arabs Ban, and by the Persians Azad-i-Durukht. It is probable therefore that this may be one of the trees included under the *Azedarach* of Avicenna. The seeds are bitter, and considered, laxative and anthelmintic, as is also the bark. *M. tomentosa* is a species found in the Island of Penang; and *M. composita*, in which are included both *M. superba* and *M. robusta*, is a species found in Malabar and Mysore.—*Eng. Cyc.*

(5275) MELIA ROBUSTA. A large tree a Native of Malabar: in seven years the trunk of one raised in the Calcutta gardens attained a circumference of forty-four inches and a height of forty-six feet.—*Rohde M.S.S.*

(5276) MELIACEÆ, *Meliads*, a natural order of Polypetalous Exogenous Plants, distinguished from all others by their stamens being united into a complete cup, within and often below the rim of which the anthers are inserted. It consists of trees or shrubs with alternate often compound leaves, inhabiting all countries within the tropics, but very rare in colder climates; *Melia Azedarach*, or Bead-Tree, a Syrian plant, now naturalised in the south of Europe, forming the principal exception. In general the species are bitter and astringent, but they are sometimes dangerously poisonous, acting violently as emetics and purgatives. Notwithstanding this, the pulpy fruit of the *Lanseh* is esteemed in the Indian Archipelago; and that of *Milnea edulis* is eaten in Silhet where it seems to resemble the Litchi and Longan of China. There are 33 genera and 150 species.—*Eng. Cyc.*

(5277) MELIA SEMPERVIRENS or BUKAYUN. Ever-green Bread Tree.

Bukayum, Bukain, PERS.
Bam, ARAB.
Maha nimba, BENG.

A smaller tree than the M. Azedarach—the flowers bluish.—*O'Shaughnessy, page* 243-244. It is common at Ajmeer; as is also the large deciduous variety. This is the chief tree in compounds, being very ornamental when in blossom, and odoriferous.—*Genl. Med. Top. p.* 193.

(5278) MELICOCCA TRIJUGA.

Kobin or Jobin, BURM.

A most valuable timber, called by the Burmese Kobin, and employed by the natives of the country for cart-wheels, oil-mills, and other purposes requiring great strength and solidity. It is found in greatest perfection on the banks of the Sitang in the Kareen Forests above Toungboo; but it is also found throughout the Pegu and Toungboo Forests in abundance, more particularly the latter. It is also found along with Teak in Tharawaddy and Prome Forests. Light-brown wood.—*McClelland.*

(5279) MELILOTUS. MELILOT. Griffith saw large fields of melilot in the neighborhood of Ava, but Mr. Mason has not seen it in these Provinces.—*Mason.*

(5280) MELILOTUS ARBOREA. BOKHARA CLOVER. A plant under this name has attracted some notice in Ireland, on account of its fibre. It is the *Melilotus arborea* and is nearly allied to *M. leucantha*, and therefore not a true Clover. It grows so freely as to yield five or six cuttings in the season of green herbage, from which, it is said, a considerable proportion of strong fibre may be obtained; but the Committee of the Irish Flax Society state, that the trials made in steeping this plant were unsuccessful with them.—*Royle, Fib. Pl. p.* 298.

(5281) MELOE. The Linnæan genus *Meloe* included the several genera of Heteromerous *Coleptera* now forming the family *Cantharidæ*, interesting on account of its including those beetles known under the name of 'blistering flies,' and employed in medicine. [CANTHARIDÆ.] The term *Meloe* is now restricted to the Apterous *Cantharidæ*, and the species are all beetles with large and swollen bodies, and short oval elytra, lapping over each other at the base of the suture. They are sluggish creatures and feed on various plants, especially the species of *Ranunculus*. When alarmed they emit from the articulations of their legs an oily, yellow, or reddish liquid. Latreille maintained that this insect was the *Buprestis* of the ancients, to which noxious qualities were attributed. (See his paper on the subject in the 12th volume of the 'Memoires du Museum d'Hist. Naturelle.') The nature of the larva of the *Meloe* has been a subject of considerable discussion among entomologists, having been supposed to be a minute, active, parasitic animal found on bees and flies. Most entomologists have held this view since the time of Linnæus, but the observations of Geoffroy, Newport, and Westwood, go far to prove that it is a mistake, and that there is no anomaly in the case.—*Eng. Cyc.*

(5282) MELOE TELINI. MYLABRIS CHICOREI. The blistering-beetle, or native blister-fly of East India, abounds at Lahore.—*Dr. Honigberger, p.* 307. Telini is the Hindoostanee name given in the higher provinces of India to an excellent substitute for the Spanish fly. It abounds in Bengal, Behar and Oude; particularly in the rainy season, during which period, Dr. Fleming tells us, it is seen feeding on the flowers of Cucurbitaceos plants. Ainslie had not met with it in lower Hindoostan.—*Ains. Mat. Med. p.* 118.

(5283) MELOE TRIANTHEMA. While the fly called Telini in higher Hindoostan is often used as a substitute for the Spanish fly, Dr. Fleming informs us that another species of Meloe, which has got the scientific appellation of Meloe Trianthema from being frequently found in fields over-run with the common plant Trianthema Decandia (Willd.) is now much used, as a safe and efficacious epispastic in the Medical Hospitals of the upper provinces. Its peculiar qualities were discovered by Dr. Adam Burt, Superintending Surgeon of the Bengal Establishment, in 1808, who first noticed the insect in fields around Muttra; it has since, however, been ascertained that it abounds in every part of the Doab, and in the districts on the right banks of the Jumna. Dr. Ainslie learned that this valuable fly had never been met with in lower India.—*Ainslie's Mat. Med. p.* 297.

(5284) MELOCHIA CORCHORIFOLIA, Lin. Hort, Mal,

Poonnaroo keera, TAM.
Tsjerou, UREA.
Gaunka peindie koora, TEL.

The whole of this plant, with the exception of the root boiled in oil, is supposed, on the Malabar coast, to be an efficacious remedy for preventing bad consequences from the bite of a water snake. See Hortus Malabaricus, part 9th page 143.—*Ains. Mal. Med. p.* 134.

(5285) MELON.

Khurbooza, HIND.

Rock, green, and musk melons are all sown in the Deccan at the same time,—generally in beds of rivers where the soil is light and sandy. They are very seldom sown in gardens. The seed is put down in November, three or four together, with as rich manure as can be procured. The plants must not be close together—a distance of from six to eight feet is generally allowed. They come in about March, and continue until the rains. In Bombay they are in season at the same time, and a second crop is grown during the rains: this is not the case in the Deccan. The water melon (*Hind.* Turbooza) is also to be had at the same time, and grown in a similar manner. The seed should always be preserved from the finest and richest-flavored fruit, and is better for being three or four years old. The green melon is the finest flavored, although many of the others are very good, the melons growing finer in the sandy beds of rivers is attributed to the temperature being more equal about the roots than it is in beds in the garden—especially during the night.—*Riddell.*

(5286) MELON, MUSK. CUCUMIS MELO. A very indifferent musk melon is cultivated by the natives generally.—*Mason.*

(5287) MELON SEED OIL, CUCUMIS MELO. Pitcha Pusjhum—harbooza, Khurbooza.

(5288) MELON, WATER. CITRULLUS CUCURBITA. Both Burmese and Karens raise water melons, but they are neither so large nor so sweet as those of America.—*Mason.*

(5289) MEMECYLACEÆ, are a very small natural order of Polypetalous Exogenous Plants, consisting of a few tropical species of little interest. Most of them inhabit the East Indies, the Mauritius, and Madagascar. They are in habit and foliage like *Myrtaceæ*, with which order they agree in most respects; but they have anthers which in form resemble those of many *Melastomaceæ*, and the leaves have no transparent dots. From the latter order they are distinguished by their leaves not being ribbed, and by their cotyledons being convolute. In the opinion of Brown and Chamisso, it is rather as a section of *Melastomaceæ* than as a peculiar order, that *Memecylaceæ* are to be accounted. No useful properties have been assigned to any of the species, except to *Memecylon edule*, an East Indian plant, whose leaves, according to Roxburgh, are an ingredient in the dyes of Coromandel, and whose ripe astringent pulpy black berries are eaten by the natives.

(5290) MEMECYLON EDULE, Roxb. 82.

Aalee pundoo, Tel.

Aalee pundoo is the Teloogoo name of a berry which grows upon a small bush, common in most jungles on the Coromandal coast, it has much pulp of a bluish color, and is of an astringent quality.—*Ainslie, p.* 221.

(5291) MEMECYLON TINCTORIUM. Aliakoo or Casau clay.

Kasha marum, Tam.	Alaika chettoo, Tel.

This tree is said by Rheede to abound in the woods about Cochin. Its leaves are known to be used as a dye stuff.—*M. O. C.* It is a small tree, common in jungles in the Carnatic. The wood is brought into Madras for firewood and a large quantity of the leaves are imported daily for dyeing purposes. Cold infusion of the leaves imparts a yellow dye.—*M. E. J. R.* In Tenasserim, this small blue flowered species of memecylon bears its flowers in compound corymbs, which contrast favourably with its shining green leaves,and is interesting to the florist in that country, where blue flowers are so rare.—*Mason.*

(5292) MENISPERMACEÆ, *Menispermads*, an important and extensive natural order of Exogenous Plants, considered by some to be Polypetalous, and referred to De Candolle's Thalamifloral sub-class ; by others placed among the *Monochlamydeæ* of that author. The order consists of twining or scrambling shrubby plants with alternate leaves without stipule, and small greenish or white unisexual flowers, often collected in large loose panicles or racemes. The floral envelopes are arranged in a power of three or four, and usually in more rows than one ; whence arises the opinion that these plants belong to Polypetalous Exogens, the inner series being regarded as a corolla. The stamens are either distinct or monadelphous, either equal in number to the inner series of the calyx, and of the same number or much more numerous. The carpels are in most cases three, or some multiple of that number, either distinct from each other or consolidated. The fruit consists of succulent one-celled drupes, with a solitary seed and a horse shoe shaped embryo with thin flat cotyledons. The wood of the stem is arranged essentially upon the Exogenous plan, but has some striking peculiartics. According to M. Decaisne, it has no annual concentrical layers. The woody plates are always simple and do not divide longitudinally, as in other Dicotyledons, but increase each year by the formation of a new woody layer outside the former and inside the liber. The latter ceases to grow after the first year. In *Cissampelos Pereira* and some others, new woody plates, like the first in appearance, but having no spiral vessels or liber, show themselves, at the end of several years, on the outside of the first, and produce around them a concentric circle, a formation which may be repeated a great many times. ('Comptes Rendus,' v. 393.) The order is common in the tropics of Asia and America, but uncommon out of these latitudes. All Africa contains but five, North America six, and Siberia one. The species are universally found in woods twining round other plants. *Cocculi* are most common in the Old World, and *Cissampeli* in the New World. *Menispermaceæ* are usually bitter and tonic plants ; the species of *Cocculus* called *Bakis Fibraurea*, *cinerascens*, and others, are used in their native countries as a remedy for intermittent fevers. *Cocculus palmatus* furnishes the Calumba Root of the shops, a valuable bitter. *Pereiria medica* is used for the same reason in Ceylon as is *Clypea Burmanni* in Malabar, and various sorts of *Cissampelos* in Brazil. But the bitter principle, which in its diluted state is thus valuable, becomes a dangerous poison if concentrated, as in the seeds of *Anamirta cocculus*, the Cocculus Indicus of the shops. There are 11 genera and 175 species of this order.—*Eng. Cyc.*

(5293) MENISPERMINA, a vegetable alkali extracted by Pelletier and Courbe from the *Menispermum cocculus*, or *Cocculus Indicus*, in the shells of the fruit of which it occurs.—*Eng. Cyc.*

(5294) MENISPERMUM (so called from μήνη, the moon, and σπέρμα, seed, from the crescent-like form of its fruit), a genus of the natural family of *Menispermaceæ*, which formerly contained numerous species, many of them valuable for their medicinal and other qualities, such as the Calumba Root, and the berries called *Cocculus Indicus*, which are now referred to the genus *Cocculus*. *Menispermum*, as at present constituted, contains but few species ; and these are climbing shrubs, which have their sepals and petals in quaternary order, arranged in two or three whorls. Male, stamens 16 to 20 ; Female, ovaries 2 to 4 ; drupes baccate, round, kidney-shaped, single-seeded. *M. Canadensis* and *M. Smilacinum* are found in the United States of America, and *M. Dauricum* in the wooded hills of Dauria.—*Eng. Cyc.*

(5295) MENTHA, a genus of Plants belonging to the natural order *Lamiaceæ*, or *Labiatæ*. It has a campanulate or tubular calyx, 5-toothed equal, or somewhat 2-lipped, with the throat naked inside or villous ; corolla with the tube inclosed, the limb campanulate, nearly equal, 4-cleft, the upper segment broader, nearly entire, or emarginate : stamens 4, equal, erect, distant ; filaments smooth, naked ; anthers with two parallel cells ; style shortly bifid, with the lobed bearing stigmas at the points ; fruit dry and smooth.—*Eng. Cyc.* Several of the Mints, remakable for their odour and taste, have long been used in medicine μινθα, 'Ηδυοσμος and Καλα μινδα of the Greeks, *nana* of the Arabs), and some as sweet herbs ; but it is difficult to distinguish one species from another by the short descriptions given.—*Royle.*

(5296) MENTHA CRISPA. Lin.

Widdalilam, TAM.
Poodina, DUK.

Ainslie's Mat. Med. p. 258.

(5297) MENTHA PIPERITA, Peppermint, is found by the sides of ditches and rivers in Britain, all over Europe, in Egypt, the middle of Asia, India, and North and South America. It has a procumbent ascending branched stem, reddish, quite smooth, or fringed with a very few spreading hairs ; petioles generally ciliated ; leaves ovate-oblong, or somewhat lanceolate, rounded at the base, deep-green, smooth, or hairy on the under side ; the upper floral leaves small, lanceolate, subulate, shorter than the flowers ; whorls few, lax, the uppermost collected into a short oblong obtuse reddish spike, the lowermost remote, with the cymes shortly stalked ; bracts subulate, the outer ones as long as the calyx : pedicels quite smooth ; teeth of the calyx hispid, subulate, erect. Peppermint is an aromatic stimulant, and the most pleasant of all the mints. It is employed in medicine for several purposes ; the volatile oil is an antispasmodic.—*Eng. Cyc.*

(5298) MENTHA PULEGIUM, Pennyroyal also a British plant, is found in wet ditches in most parts of Europe, also the Caucasus, Chili, and Teneriffe.

(5299) MENTHA ROYLEANA, is much used by the Hill people of the Himalayas.—*O'Shaughnessy, p.* 489.

(5300) MENTHA SATIVA.

Widdatilam. TAM.
Poodina, DUK.
Nana, ARAB.
Hibbuk, ARAK.

Is prescribed by the Mahomedans in dyspeptic complaints and to stop vomiting.—*O'Shaughnessy, p.* 489.

(5301) MENTHA VIRIDIS, Spearmint, is a native of Britain, and is also found in the milder parts of Europe, the Canaries, Cape of Good Hope, and America, both North and South. It is a creeping rooted herbaceous plant, with an erect smooth stem ; leaves subsessile, ovate-lanceolate, unequally serrated, smooth, those under the flowers all bract-like, rather longer than the whorls, these and the calyxes hairy or smooth ; spikes cylindrical, loose : whorls approximated, or the lowest or all of them distant. This plant greatly resembles *M. piperita.* The colour however is of a deep green. It is also frequently confounded with *M. crispa*, than which it has a stronger and more agreeable odour, but weaker than peppermint. It has not the aromatic odour of that plant, nor does it leave the sense of coolness in the mouth. From it are prepared a distilled water, a spirit, and a volatile oil, which are used as the former.—*Eng. Cyc.*

(5302) MENTHA VIRIDIS. SPEARMINT. Pahari Poodena. A native of Cashmere but cultivated in the plains for its essential oil and distilled water.—*O'Shaughnessy, p.* 489.

(5303) MENISPERMUM CORDIFOLIUM. HEART LEAVED MOON SEED, *Russel.*

Sheendie codie, TAM.
Goolbayl, DUK.
Gurcha, HIND.
Cita-merdoo, MAL.
Tippatingay, TEL.
Guduchi, also Amoorta, SANS.

Very common in the Ajmeer hills ; M. Cordifolium &M. Glabrum are called Gullanchi by the natives indifferently.—*Genl. Med. Top. p.* 211. The powder of the dried tender shoots of this creeper which is bitter, and a little nauseous to the taste, the Tamool Practitioners prescribe as an alterative in cases of depraved habit of body proceeding from visceral obstruction and Jaundice. Dr. Fleming informs us that the Hindoo Physicians consider a decoction of the leaves as a febrifuge and as a tonic in gout. And this plant (which in some parts is called Somalatay) is bruised and put into water and taken by the Brahmins at some of their religious ceremonies.—*Ains. Mat. Med. p.* 112.

(5304) MENISPERMUM CORDIFOLIUM, INFUSION. An infusion of Gulancha is an excellent alterative tonic and diuretic. It is especially valuable in convalescence from fevers, and in secondary venereal affections. Dose, two to four ounces thrice daily.—*Beng. Phar. page* 300.

(5305) MENISPERMUM CORDIFOLIUM, TINCTURE. A tincture of Gulancha, is Tonic and febrifuge. Dose, two to four fluid drachms repeated as required.—*Beng. Phar. p.* 427.

(5306) MENISPERMUM GLABRUM. NIM-GILO GULANCHA. A climber found often on Neem trees : the whole plant is very bitter, the stem is chiefly used : six masses are given as a dose, with other ingredients in fevers. An extract called "giloysut," is prepared and much used.—*Genl. Med. Top. p.* 148. Common in Ajmeer. The whole plant is used in fevers as elsewhere in India, every part is very bitter ; an extract is prepared called Giloysut, from the stems and leaves.—*Genl. Med. Top. p.* 210.

(5307) MENISPERMUM VERRUCOSUM. WARTY-STEMMED MOONSEED. Found in the Ajmeer hills.—*Genl. Med. Top. p.* 211.

(5308) MENISPERMUM VILLOSUM. WOOLLY MOON-SEED. Found in the Ajmeer hills.—*Genl. Med. Top. p.* 211. I only obtained one specimen of a plant which I am almost sure was the Cocculus Indicus or Plunkenetu, but I could not again obtain portions of the plant, the person who first brought it, having forgotten where he first found it.—*Genl. Med. Top. p.* 211.

(5309) MENYANTHES INDICA, INDIAN BUCKBEAN.

Bura-chooli, HIND.

In standing water at Ajmeer and Poshkur.—*Genl. Med. Top. p.* 180,

(5310) MERCURY, QUICKSILVER.

Abuk, Zibakh, ARAB.
Shwuyyin, CHIN.
Mercure, Vif-argent, FR.
Quecksilber. GER.
Para. GUZ. & HIND.
Argento Vivo, IT.
Hydrargyrum, LAT.
Rassa, MAL.
Seemab PERS.
Rtut. RUS.
Rosa, Sutum, Parada, SANS.
Azogue, SP.
Rasam. TAM.
Rasam, TEL.

Mercury ($Hg=202$), or Quicksilver, was known to the ancients. The Romans seem to have employed it as a medicine externally (p. 133), as did the Arabs; but the Hindoos were probably the first to prescribe it internally. (*v.* p. 191.) It is found in China, at Almaden in Spain, and Idria in Carniola, and likewise in South America. It occurs occasionally in metallic globules; usually as the native Bisulphuret or *Cinnabar*; combined with Silver, forming a *Native Amalgam*; or with Chlorine, as in *Horn Mercury*. It is chiefly obtained from the Sulphuret by distillation with lime or with Iron, which combining with the Sulphur, the metal distils over and is condensed.—*Royle.* Quicksilver, or native mercury, is imported from Burmah into Tenasserim, and it is said to be brought to Ava from China.—*Mason.*

(5311) MERCURY, BICHLORIDE OF: CORROSIVE SUBLIMATE. This is much used as a preservative of timber, canvas, &c. from the ravages of mildew, the dry rot and of white ants. A solution is made in the proportion of one pound to four gallons of water, and in this the article to be protected is steeped a variable time according to its nature —*Beng. Phar. p,* 340,

(5312) MERCURIAL PREPARATIONS OF INDIA. *Russa Karpoor.* Several preparations of mercury have been described by the Sanskrit and Tamul writers, especially in the "Purana Sastram," a work on Materia Medica and religious observances. The processes Dr. O'Shaughnessy examined generally led to the production of a mixture of calomel and corrosive sublimate, and the analysis of all the bazar preparations he collected, shews their composition to be a mixture of varying proportions of these substances. The Raskarpur is generally considered to be corrosive sublimate, but on analysis he found that it is usually calomel. Once, however, he met a specimen which was corrosive sublimate of the finest kind. The cause of the uncertainty is to be traced in the different portions of the ingredients recommended by different native writers, and which of course must lead to the results described.—*Beng. Phar. p.* 342.

Russapuspum.—This is a sort of muriate of mercury, in great repute amongst the Tamuls, and which appears to be administered by them in larger doses than any other preparations of this metal. But it generally happens that through defective manipulation a mixture of calomel and the bi-chloride is formed.—*Beng. Phar. p.* 342.

Shavirum.—This strange compound is administered by the Tamuls in very small quantities; and it ought to be so, as it is evidently a harsh, uncertain, and dangerous preparation. In the mode of preparing it, the vapours of calomel simultaneously rising and meeting the chlorine are converted into the bi-chloride of mercury, the preparation now described.—*Beng. Phar p.* 342.

(5313) MERIANDRA BENGALENSIS; a plant of the family of Labiatæ.

Kafoor ka putta, HIND.

Is in use amongst the people of India.—*O'Shaughnessy, p.* 492.

(5314) MERIANDRA STROBILIFERA. (MURTOO) of the family of Labiatæ has a strong fragrance, and is considered by Royle as very promising.—*O'Shaughnessy, p.* 492.

(5315) MERINO. The term applied to a fine kind of woollen fabric, of various colours. —*Faulk.*

(5316) MEASKHEE FIBRE, BOEHMERIÆ SPECIES (Urticeæ). A fibre is enumerated by Major Hannay ('Journ. Agri-Hortic. Soc.,' vii, p. 217), which he says is called *Mesakhee*, and is an *Urtica*, but not a stinging one. It is a shrubby tree, probably a species of *Boehmeria*, and is very abundant. Its young branches, which are tender and red-coloured, as well as its leaves, are edible. Capt. Thompson had a log-line made of the fibre and found the strength of it quite equal to Russia Hemp, but for want of being properly harvested, the fibres cling so close together that great loss of material takes place in heckling it. He thinks it well adapted for cordage, and if brought into general use ought to bring as much as Petersburgh Hemp." ('Journ. Agri-Hortic Soc.,' viii, p. 60.) Major Hannay says: "The Murrees and others might be induced to bring the fibre for sale; but as the value of this Nettle in the market has not been ascertained, I have only offered at the rate of Rs. 5 per maund which, however, on account of the slow method of manipulation, has not been rendered remunerative." (l. c., p. 86,) Of Major Hannay's Nos. 9, 7, and 8, the first, which is the foregoing, he says is called *Mesakhee* or *Mejingah*, the other *Mesakhee*. No. 9 has but little fibre and a very rough stem. No. 7 has much the same habits as Bon Rheea., and can be cultivated like it. Its fibre is also of the same character, but white, strong, and durable. It is used for the same purposes. Capt. Dalton, in a letter, dated 20th July, 1854, referring to what Dr. Royle had said respecting the Wild or Bor. Rheea, writes ; "As he alludes to the batch sent through this office by Major Hannay in 1853, he must refer to the 'Mesakhee,' of which large quantities are procurable, growing wild in Upper Muttock and elsewhere in the district. The instructions regarding the specimen of Petersburg Hemp sent out as a sample are more applicable to this fibre than to the Dom Rheea. I propose to take measures for collecting as much of it as I can get prepared. The cost will be from three to four annas a seer. This might be accompanied by samples of the *Bon Rheea*, *Bon Surat* and other fibres, all prepared to resemble the Petersburgh Hemp. If for these wild fibres we had a good market, the frontier tribes, Singphoos &c., who understand how to prepare them, might be induced to assist in supplying them." The specimens which Dr. Royle had referred to in the above communication were sent under the name of Bon Rheea from India. The two plants, *Bon Rheea* and *Mesakhee*, may be identical or nearly allied species, but this cannot be ascertained without authentic Botanical specimens. Major Hannay distinguishes the two kinds—the *Bon Rheea* being his No. 2 and *Mesakhee* No. 9—in his paper in the 'Journ. Agri-Hortic. Soc.,' vii, p. 215.—*Royle. Fib. P. p.* 365.

(5317) MESONA WALLICHIANA. A Labiate plant that grows on the Jyntea Hills, on the ascent, whose bruised leaves smell as strongly of patchouli, as do those of the plant producing that perfume, to which it is closely allied.—*Hooker, Vol.* II. *p.* 314. *Pogostemon Patchouli* has been said to occur in the Khassia Hills of India, but Dr. Hooker never met with it, and doubts the accuracy of the statement. It is a native of the Malay peninsula, whence the leaves are imported into Bengal, and so to Europe.—*Hooker, Him. Jour. Vol.* II, *p.* 314.

(5318) MESPILODAPHNE PRETIOSA. WOODS NEAR PARA. Inner bark and rind of the calyx very fragrant, resembling cinnamon and bergamot.—*O'Shaughnessy, p.* 547.

(5319) MESUA. The mesua, which in Ceylon is called "iron woodtree," though not large, has an erect symmetrical figure, whose deep evergreen foliage, flowing downward from its cone shaped crest, quite conceals its bowering branches, so that when covered with its rich blossoms, with ivory-white petals and deep yellow stamens, it looks like the royal umbrella bespangled with gold; and the Burmese say that their next Budha, *Aree-ma-taya*, will enter the divine life while musing beneath its hallowed shades, hence it is a favorite tree with the priests who plant it around their monasteries. In Sanscrit it is called nagakeshura, and Sir William Jones remarks of it: "This tree is one of the most delightful on earth; and the delicious odor of its blossoms justly gives them a place in the quiver of Camadeva, the Hindoo god of love." To this Moore alludes in the following stanza.

> "Then rapidly with foot as light
> As the young musk roe's, out she flew
> To cull each shining leaf that grew,
> Beneath the moonlight's hallowing beams
> For this enchanted wreath of dreams;
> Anemones, and seas of gold,
> And new-blown lilies of the river,
> And those sweet flowerets that unfold
> Their buds on Camadeva's quiver."

There are at least two different species in the Tenasserim Provinces, *M. pedunculata* and *M. ferrea*. Much confusion exists in our standard works on botany in relation to this last species. The *Mesua ferrea* of Roxburgh is the *M. Roxburghii* of Wight's illustrations; the Mesua tree of Calcutta, Serampore, and neighbourhood.—The *M. ferrea* of Wight's Prodromus is the *M. Coromandelina* of Wight's Icones, and Illustrations—The *M. ferrea*, of Wight's Illustrations, is the *M. nagaha* of Gardener, the mesua tree of Ceylon; while the *M. ferrea* originally described by Linnæus is *probably* the species found on this coast; but for the lack of books which contain the description of Linnæus, it cannot be affirmed with certainty.—*Mason.*

(5320) MESUA FERREA, NAGSARA OR NAGKESUR. As. Researches, iv. 295. Lin.

Irool Marum, TAM. | Nagacessara, SANS.
Nagasar, HIND.

The blossoms of this tree, which Sir W. Jones says, is one of the most beautiful on earth, are extremely fragrant, and with them one of the five arrows of Kama the god of love, is tipped.—*Ains. Mat. Med. p.* 163. Under the Tamool name of Irool maram this or another species of Mesua is common in the Nelambore jungles and much used by the natives for building purposes; being durable and not liable to be attacked by insects.—*McIvor. M. E. of* 1857. Mesua Ferrea is cultivated in gardens at Jaepoor, is very ornamental and the flowers are fragrant.—*Genl. Med Top. p.* 199. This tree is found chiefly in gardens in Bengal, where it flowers in the beginning of the warm season. The dried anthers are fragrant; the flowers and leaves are used in Bengal as antidotes to snake poison.—*O'Shaughnessy, p.* 281.

(5321) MESUA.—Irool Marum Mesua sp: Nelambore Jungles common: much used by the Natives for building purposes: durable and not liable to be attacked by insects.—*McIvor.*

(5322) METALLIC MIRRORS are still in use in Southern Asia.

(5323) METROSIDEROS (from *μήτρυ*, the heart of a tree, and *σίδηρος*, iron), a genus of Plants belonging to the natural order *Myrtaceæ*. It is distinguished from allied genera by the tube of the calyx not being angular, adhering to the ovarium, the limp 6-cleft; the stamens 20-30, free, very long, and exserted; the style filiform, and stigma simple; the capsule 2- or 3-celled, the cells many-seeded ; the seeds wingless. The species are trees or shrubs, with opposite or alternate leaves, with the flowers pedicellate, not adnate to the branches, as they are in the genera *Melaleuca* and *Callistemon*. The last genus with *Angophora*, has been recently separated from *Metrosideros*.—*Eng. Cyc.*

(5324) METROSIDEROS VERA, true Iron-Wood, has opposite ovate-lanceolate acuminated quite glabrous leaves, seated on short petioles ; the cymes axillary, pedunculate, many flowered. It is a native of Java and Amboyna, among rocks. The Chinese and Japanese value the wood of this tree, which they apply to many purposes, as the making of rudders, anchors, &c., for their ships and boats. The bark is used in Japan as a remedy in mucous discharges, diarrhœa, and dysentery. It is usually mixed with some aromatic, as Penang cloves, or nutmeg.—*Eng. Cyc.*

(5325) METROSIDEROS POLYMORPHA, has opposite coriaceous leaves, of various forms, glabrous on both surfaces, but covered with a little silky tomentum beneath ; the peduncles 3- or many-flowered, terminal and axillary, corymbose : the calyxes and branchlets glabrous or clothed with silky tomentum. The species is a tree, and grows in the Sandwich Islands, and is said to be the plant from which are made the clubs and other weapons employed in warfare by the South Sea Islanders. "The Aki, or Lignum Vitæ of New Zealand, the Rata and the Pohutu Kawa of the same country, are all hard-wooded trees belonging to the genus *Metrosideros*." (Lindley.) Several other species of *Metrosideros* have been described, natives of Australia and the South Sea Islands. *M. lucida*, a beautiful tree, occurs as far south as Lord Auckland's Islands, in lat. 50½ S. The *M. buxifolia* of Allan Cunningham is the New Zealand plant called Aki, and is a rambling shrub, adhering to trees, and climbing by means of its lateral roots to the summits of the loftiest trees in the forests of Wangaroa and the Bay of Islands. In cultivation these plants may be grown in a mixture of loam, peat, and sand. They may be propagated by seeds or cuttings. Ripe cuttings will root in sand under a hand-glass. (Don, *Dichlamydeous Plants* ; Lindley, *Vegetable Kingdom* ; Burnett, *Outlines of Botany*.)—*Eng. Cyc.*

(5326) METROXYLON SAGO, *Syn* SAGUS KONIGII.

Rambaya, MALAY.

Is cultivated in the Eastern Archipelago, to obtain sago from its wood.—*Seeman*.

(5327) MEZEREUM BARK, MAZRIOON, Rei ; Root of Daphne mezereon. Linn.—*Ben. Ph.* 214.

(5328) MEZEREON, OCTANDRIA TRIGYNIA, Linn. This plant is supposed to be included with *Daphne oleoides* under the χαμελαια of Dioscorides. It is called *Mazrioon* in Persian works on Materia Medica, and *Khamela* assigned as its Greek name. Mezereon is a small shrub. Leaves lanceolate, tapering below, smooth, evergreen. Flowers subternate, lateral arranged in a spike-like manner, appearing before the leaves, rose-coloured. Perianth 4-fid, segments ovate acute, tube hairy, Stamens 8, short inserted (1) in the tube of the perianth in two rows. Ovary (2) oval, oblong, with a short style and peltate and stigma. Berry bright red, fleshy, 1-seeded (v. 3), where some of the sarcocarp has been removed, to show the seed.—Woods of central Europe, less common in Great Britain ; cultivated in gardens as an ornamental shrub.—Nees von E. 125. St. and Ch. 65. *D. Gnidium* (Fr. *Garow*), *D. Laureola*, Spurge Laurel, and other species, are also employed on the continent. The bark of the latter forms much of what is used, even in England, for Mezeroon—Squire, P. J. i. 395. The bark of the root is officinal in the L. and E. P. and is the most efficacious ; that of the stem and branches in the Dublin Pharmacopœia ; but all these parts as well as the berries, are acrid. The bark is tough and fibrous, as in all Daphnes ; it is met with in strips which are of a light greyish colour externally, whitish and shining within ; when fresh dried, it has a slight but peculiar odour. The taste, especially of the inner part of the bark, is hot, acrid and durable, though at first a little sweetish.—*Royle, page* 528.

(5329) MICA.

Abraka, SANS. Tulk, PERS. and DUK.	Ubruck, HINDU.

Several varieties of this beautiful and useful mineral are found in India, especially in Behar, and in the Northern Circars. It readily splits into transparent, elastic flakes. It consists of nearly equal parts of silica and magnesia, and about 6 per 100 of lime. Slips of Mica afford the young chemist a very convenient substitute for platinum foil, in several experiments especially on the effect of heat on organic bodies. —*O'Shaughnessy, page* 694. Mica, is a Mineral belonging to the extensive series of Silicates of Alumina. It occurs in oblique rhombic prisms of about 120° and 60°. The crystals usually with the acute edge replaced. The cleavage is very decided, yielding easily thin elastic laminæ of extreme tenuity. It is found usually in thinly foliated masses, plates, or scales : sometimes in radiated groups of aggregated scales or small folia. The colour is from white through green, yellowish, and brownish shades, to black. The lustre is more or less pearly. Transparent or translucent. Tough and elastic. Hardness 2·0 to 2·5. Specific gravity 2·8 to 3·0. Mica resembles externally talc, and some forms of gypsum. From talc it differs in affording thinner laminæ, and being elastic. It also has not the greasy feel of talc. The same characters, except the last distinguish it from gypsum, besides it does not crumble so readily on heating. Mica is one of the constituents of granite, gneiss, and mica-slate, and gives to the latter its laminated structure. It also occurs in granular limestone. It is found abundantly in India in the United States, in Russia, in Great Britain, and other parts of the world. It is not often found in large isolated masses, but filling up the veins and fissures of rocks, into the composition of which it enters. It occurs in the oldest rock, as well as in those which are new and possess a crystalline character. In Russia it is used extensively as a substitute for glass, and hence it is called Muscovy Glass. The very thin laminæ are employed for examining objects under the microscope. Hauy states that these laminæ are sometimes not more than the 1-300,000th part of an inch in thickness — *Eng. Cyc.*

(5330) MICHELIA CHAMPACA.

Shemboogha poo. TAM.
Chumpeka pool, DUK.
Schampakam, HORT. MAL.
Bongas jampacca, MALAY
Shumpenghie poo, TEL.
Champac. SANS.

This beautiful golden coloured flower is held in high estimation by the Hindoos, by whom it is dedicated to Krishna and is one of those with which the five Arrows of Kama the god of love are said to be tipped. Sir William Jones tells us, that its aromatic scent is so strong as to be offensive to Bees, who never alight upon it. Rheede informs us that the powder of the bark of the root of this tree is given to excite the flow of the menses. The wood itself is employed in making drums.—*Ains. Mat. Med. p.* 157. In Pegu *Michelia Champaca* is a large tree, cultivated greatly by the Burmese for the fragrance of its yellow flowers. It is from this that the aromatic *Sumpunghee oil* of the Madras list is obtained —*McClelland.* In Tenasserim the streets of the towns and villages are often shaded with the lofty distinguished champac, one of the few trees embalmed in English song of which the poet sings :

> " The maid of India blest again to hold
> In her full lap the Champac's leaves of gold.
> Thinks of the time when by the Ganges' flood
> Her little playmates scattered many a bud
> Upon her long dark hair."

The tree is in flower or fruit a great part of the year, and its rich orange blossoms, which are exquisitely fragrant, are also used by Burmese maidens to adorn their " long black hair." It is the only representative on that Coast of the " Glory of America"—the magnolia tribe.—*Mason.* The bark of this well known tree is bitter, and aromatic, and on several trials appeared to Dr. O'Shaughnessy to possess the properties attributed to the Magnolia glauca. It may be given in powder in intermittent fevers in doses of from 10 to 30 grains. Its aromatic properties are dissipated by boiling either in water or spirit, and on evaporation a bitter extract remains, which contains tannic and gallic acid.—*O'Shaughnessy, page* 193. The roots of the Uvaria narum are employed in the Mauritius in decoction as tonic and stimulant, and are externally applied for destroying vermin. The powdered seeds of the custard apple are used in Bengal for the same purpose.—*O'Shaughnessy, page* 193.

(5331) MICHELIA NILAGIRICA. MAGNOLIACEÆ, Ill. 5, Icon. 938.

Shemboogha marum, TAM.

This tree is rare in the Walliar forests, being alpine in its tendencies. It is common on the Neilgherries, wood said to be good as regards strength, but too highly hygrometrical to be useful in other form than rafters or beams, though close and fine grained.—*Wight.*

(5332) MICHELIA RHEEDII. PELLA CHUMPA OR GOLDEN FLOWERED CHUMPA.

Sampaughy Marum, TAM.

This is a handsome tree with beautiful golden coloured flowers, held in high estimation by the Hindoos, the bark of the root of the tree is used medicinally in some female complaints.—*Riddell.* The Michelia Rheedii, (*Wight*) Sumpaghymaram, yields a pretty olive colored mottled wood, close grained, without being heavy, and well suited for cabinet making. It is, being tried in Bombay for ship building purposes. At the Madras Exhibition of 1855, a very large plank was contributed by Capt. Cunningham of the Mysore Commisssion, obtained from *Michelia Rheedii* (Sumpaghy). The extraordinary dimensions, (length 11½ feet, breadth 4½ feet, thickness 3 inches,) which the tree assumes, though rarely, and the ornamental character of the wood, were well shown in that specimen, which may with justice be declared *unique.* This remarkably large specimen was apparently derived from a tree of very great age.—*M. E. J. R.*

(5333) MICO. A sort of butter prepared in Japan from the Dolichos bean.—*Simmonds.*

(5334) MICROLÆNA SPECTABILIS, is a tree found at the foot of the Himalayas, which yields fibres for rope-making.—*Royle.* It is one of the most numerous timber trees of Pegu, and yields, it is said, a fibre fit for making rope, but the Burmese do not make use of it.—*McClelland.*

(5335) MICROPUS (Swainson), a genus of Birds belonging to the family *Brachypodinæ*, the first sub-family of the *Merulidæ*, according to his arrangement. [MERULIDÆ.]

(5336) MICROPUS CHALCOCEPHALUS. Ixos CHALCOCEPHALUS, Temm. The male has the whole head covered with a sort of hood of metallic black with violet reflection ; the neck, the shoulder, the back, and wings, dull gray or lead colour; breast deep gray, which becomes brighter on the other lower parts of the body; wings black, but the secondaries gray, bordered with whitish on the exterior barbs: tail gray with a transverse black band, and terminated with a broad white border. Length 9 inches 4 lines. Female: less lively in colour. It inhabits Java, where Van Hasselt found it in the wild and woody district of Bantam.—*Eng. Cyc.*

(5337) MIGNONETTE. RESEDA ODORATA.—A general favorite in all countries, may be had in great luxuriance on the plains during the cold months, does not like to be transplanted, and ought invariably, whether in pots or flower beds, to be sown where intended to flower: requires an open soil and free drainage, sometimes lives through the hot season, if sheltered by a high building.—*Jaffrey.*

(5338) MIGRATION.—The reader, curious on the subject of the migration of Indian birds, should consult a paper by H. M. Hodgson, Esq., in the 18th volume of the Asiatic 'Researches,' Part II., 122.—*Cal. Rev.*

(5339) MILDEW, PUCCINIA GRAMINIS, a fungus attacking corn, in England, the spores of which appear to enter the grass, not by the roots, but by the stomata.—*Hassall.*

(5340) MILK.

Labn, ARAB.
Ellakerrie, CYNG.
Lait, FR.
Milch, GUZ.
Dood, HIND.
Latte, IT.
Lac, LAT.
Soosoo, MAL.
Sheer. PERS.
Gokshira, SANS.
Pashuin Paal, TAM.
Aoopaloo, TEL.

The following analysis of several kinds of milk is by MM. O. Henry and Chevallier.

Constituents.	Cow.	Ass	Woman.	Goat.	Ewe.
Caseum,...	4.41	1.82	1.52	4.02	4.50
Butter,......... ...	3.13	0.11	3.52	3.32	4.20
Sugar of milk,...	4.77	6.08	6.50	5.28	6 00
Various salts....	0.60	0.34	0.45	0.58	0.68
Water	87.02	91.65	87.98	86.80	85.62
Total	100.00	100.00	10 .00	100.00	100.00
Solid matter.....	12.98	8 34	13.00	13.20	14.38

—O'Shaughnessy, page 690.

(5341) MILK HEDGE.—Euphorbia Tirucalli.

(5342) MILK OF PALM NUTS. This popular term, is the albumen of the seed when in a liquid state: and which, when the fruit is quite ripe, appears as a solid white or yellowish mass, and is then termed the kernel. This albuminous fluid or water, when the nut is taken from the tree early in the morning and whilst the dew is still upon it, is a cool and delicious draft. It is slightly effervescent and gently aperient.—*Seeman.*

(5343) MILLET.

Dukhn, ARAB.
Kungoo, BENG.
Tana-hal CYNG.
Navonay, CAN.
Cay Khe, COCH-CHIN.
Bal, Rawla, DUK.
Mil. Millet, FR.
Hirse, GER.
Kang, GUZ. HIND.
Miglio, IT.
Milium, Panicum Miliaceum, LAT.
Navaria, MAL.
Arzun, PERS.
Milho Mindoo, PORT.
Kangu, Priyangu, SANS.
Mijo. SP.
Tenny, TAM.
Coraloo, TEL.

Millet of various kinds is met with in the hottest parts of Africa, in the South of Europe, in Asia Minor and in the East Indies. In India they hold a rank second to rice alone, and those chiefly cultivated are as follows,

Botanical Names.	English.	Hindoostanee.	Tamil.
Setaria italica.	Italian millet.	Kala kangnee.	Tenny.
Setaria germanica......	German millet.........	Kora kang..... ..	....
Panicum miliaceum... ...	Common or little millet...	Sawee; cheena Warree... ...	Varagoo.
Pencillaria spicata.....	Spiked millet.	Bajree...............	Cumboo.
Sorghum vulgare...... ..	Great millet...	Jowaree..............	Cholum.
Elensine corocana........	Raggy.........	Natchnee Ragee...	Kavaroo.

The native West Indian species are P. fasciculatum and oryzoides. Setaria Germanica is the most common in America, where millet is chiefly grown for making hay, half a bushel of seed to the acre is the usual quantity, sown broad-cast and harrowed in, but to procure the finest quantity of hay, an additional three or four quarts of seed is sown. The ordinary yield of crops is about a ton to a ton and half of hay to the acre, but it should be cut as soon as it is out of blossom, for if it stands later, the stems are liable to become too hard to make good hay. In Southern India, there are three kinds of Jowaree, white, green and red, the straw is of great bulk and goodness, and furnishes good provender for cattle being preferable to that of rice. It is however given dried, as the green plant is injurious. Among culmiferous plants and legumes used in the East, are the Panicum italicum, Elensine coracana (the meal of which is baked and eaten in Ceylon under the name of Corakan flour), and Paspalum of several varieties. The piegeon pea (Cytisus Cajan:) and a very valuable and prolific species of bean called the Mauritius black bean (Mucuna utilis), growing even in the forest soil, is cultivated in India and Ceylon. Sorghum vulgare is the principal grain of Southern Arabia and the stems are also used extensively for feeding cattle. The plant bears its

Indian name of joar, or jwari, and is cultivated throughout Western Hindoostan. Mr. Simonds says Job's tears (Coix lachryma) is another cereal grass, native of the East Indies. Millet of different kinds is met with in the hottest parts of Africa in the South of Europe, in Asia Minor, and in the East Indies. One is a small yellowish seed growing in dense panicles or clusters, the produce of a grassy plant with large and compact seeds growing to the height in India of seven or eight feet. The millets are known to Europeans as petit mais, tropical crops. In India they hold a second rank to rice alone and in Egypt perhaps, surpass all other crops in importance. In Western Africa they are the staff of life. The red and white millets shown by Austria, Russia and the United states, at the Great Exhibition, were beautiful, and Ceylon exhibited fair samples, Turkey abounds in small grains. Panicum miliaceum and P. frumentaceum are the species grown in the East Indies. London says there are three distinct species of millet, the Polish, the common or German, and the Indian. Setaria Germanica yields German millet. The plants are readily increased by division of the roots or by seed, and will grow in any common soil. The native West Indian species are *P. fasciculatum* and *oryzoides*. Millet receives some attention in New South Wales. In 1844, there were 100 acres of land under cultivation with it, and the amount grown in some years in this colony has been about 3,500 bushels. In the United States millet is chiefly grown for making hay, being found a good substitute for clover and the ordinary grasses. It is a plant which will flourish well on rather thin soils, and it grows so fast that when it is up and well set it is seldom much affected by drought. It is commonly sown there in June, but the time of sowing will vary with the latitude. Half a bushel of seed to the acre is the usual quantity, sown broadcast and harrowed in. For the finest quantity of hay, it is thought advisable to sow an additional quantity of three or four quarts of seed. The ordinary yield of crops may be put at from a ton to a ton and a half of hay to the acre. It should be cut as soon as it is out of blossom; if it stands later, the stems are liable to become too hard to make good hay. The variety known as German millet is that most common in North America. It grows ordinarily to the height of about three feet, with compact heads from six to nine inches in length, bearing yellow seed. There are some sub-varieties of this, as the white and purple-seeded. The Italian millet, *Setaria italica*, is larger than the preceding, reaching the height of four feet in tolerable soil, and its leaves are correspondingly larger and thicker. The heads are sometimes a foot or more in length, and are less compact than the German, being composed of several spikes slightly branching from the main stem. It is said to derive its specific name from being cultivated in Italy, though its native habitat is India. It is claimed by some that this variety will yield more seed than any other, and the seed is rather larger, but the stalk is coarser, and would probably be less relished by stock. If the greatest amount of seed is desired from the crop, it is best to sow it in drills, two to two-and-a-half feet apart, using a seed drill for the purpose. This admits of the use of a small harrow or cultivator between the rows, while the plants are small, which keeps out the weeds. The crop will ripen more uniformly in this way than broadcast, and enables the cultivator to cut it when there will be the least waste. The seed shatters out very easily when it is ripe, and when the crop ripens unequally it cannot be cut without loss, because either a portion of it will be immature, or, if left till it is all ripe, the seed of the earliest falls out. It should be closely watched, and cut in just about the same stage that it is proper to cut wheat, while the grain may be crushed between the fingers. It may be cut with a grain cradle, and, when dry, bound and shocked like grain; but it should be threshed out as soon as practicable, on account of its being usually much attacked by birds, many kinds of which are very fond of the seed. The seed is used in various European countries as a substitute for sago, for which it is considered excellent. It is likewise a valuable food for poultry, particularly for young chickens, which from the smallness of the grain can eat it readily, and it appears to be wholesome for them. In some countries millet seed is ground into flour and converted into bread; but this is brown and heavy. It is, however, useful in other respects, as a substitute for rice. A good vinegar has been made from it by fermentation, and, on distillation, it yields a strong spirit. Millet seed—the produce of *H. saccharatum*—is imported into this country from the East Indies for the purpose chiefly of puddings; by many persons it is preferred to rice. It is cultivated largely in China and Cochin-China. The stalks, if subjected to the same process that is adopted with the sugar-cane, yield a sweet juice, from which an excellent kind of sugar may be made. Millet will grow best on light, dry soils. The ground being first well prepared, half a bushel of seed to the acre is ploughed in at the commencement of the rains in India. The crop ripens within three months from the time of sowing. The usual produce is about 16 bushels to the acre. The Canary Islands export annually about 212,400 bushels of millet.

Great Indian Millet, or Guinea Corn.—This is a native of India (the *Sorghum vulgare*, the *Andropogon Sorghum* of Roxburgh), which produces a grain a little larger than mustard or millet seed. It is grown in most tropical countries, and has peculiar local names. In the West

Indies, where it is chiefly raised for feeding poultry, it is called Guinea corn. In Egypt it is known as Dhurra, in Hindostan and Bengal as Joar and in some districts as Cush. In Lower Scinde joar is very extensively cultivated, as well as bajree (*H. spicatus*). It is harvested in December and January, requires a light soil, and is usually grown in the east, after *Cynosurus corocanus*. The natives of Mysore reckon three kinds known as white, green, and red. The red ripens a month earlier than the rest, or about four months from the time of sowing. Near Bengal, Bombay, and elsewhere, in Eastern India, sowing is performed at the close of May or early in June. A gallon and a third of seed is sown per acre, and the produce averages 16 bushels. This grain, though small, and the size of its head diminutive, compensates for this deficiency by the great bulk and goodness of its straw, which grows usually to the height of 8 or 10 feet. It is sometimes sown for fodder in the beginning of April, and is ready to cut in July. It is said to be injurious to cattle, if eaten as green provender, the straw is therefore first dried, and is then preferable to that of rice. This grain is frequently fermented to form the basis, in combination with goor or half made sugar, of the common arrack of the natives, and in the hills is fermented into a kind of beer or sweet wort, drank warm.

Holcus spicatus, the *Panicum spicatum* of Roxburgh, is cultivated in Mysore, Behar, and the provinces more to the north. From one to four seers are sown on a biggah of land, and the yield is about four maunds per acre. It is sown after the heavy rains commence, and the plough serves to cover the seed. The crop is ripe in three months, and the ears only are taken off at first. Afterwards the straw is cut down close to the surface of the soil, to be used for thatching, for it is not much in request as fodder. Being a grain of small price, it is a common food of the poorer class of natives, and really yields a sweet palatable flour. It is also excellent as a fattening grain for poultry. The *Poa Abyssinica* is one of the bread corns of Abyssinia. The bread made from it is called *teff*, and is the ordinary food of the country, that made from wheat being only used by the higher classes. The way of manufacturing it is by allowing the dough to become sour, when, generating carbonic acid gas, it serves instead of yeast. It is then baked in circular cakes, which are white, spongy, and of a hot acid taste, but easy of digestion. This bread, carefully toasted, and left in water for three or four days, furnishes the *boza*, or common beer of the country, similar to the *quas* of Russia.—*Simmonds*.

(5344) MILLELE. A wood of Ceylon probably specifically identical with sapoomilile, with which it coincides in very respect.

(5345) MILLINGTONIA HORTENSIS, BIGNONIACEÆ. An elegant tree growing to the height of fifty feet, is in blossom towards the close of the rains, and the seeds ripen in March. The bark is of a soft spongy nature, the wood is white, firm, and close grained.—*Riddell*.

(5346) MILLINGTONIA SIMPLICIFOLIA, is also scarce, but found in the Forests of the Pegu Valley. Its properties as a timber are valuable from its weight and strength. Wood, white-colored, adapted to every purpose, house-building.—*McClelland*.

(5347) MILL STONES.

Pierres meulieres, FR.	Schernowoi kamen, RUS.
Muhlsteine, GER.	Muelas de molino, SP.
Mole macine, IT.	

Are large circular stones, which, when put in motion by machinery, grind corn and other articles.—*Faulkner*.

(5348) MIMOSA, a genus of Plants belonging to the natural order *Leguminosæ*. It has polygamous flowers; petals 4 or 5, connected together into a 4 or 5 cleft funnel shaped corolla; stamens inserted in the base of the corolla, or in the stipe of the ovary, equal in number to the lobes of the corolla, or double or triple that number; legume compressed, flat, 1- or many-jointed; joints 1-seeded; ribs permanent; stipules petiolar; leaves bipinnate, with one or more pairs of pinnæ, each pinna bearing 2 or many pairs of leaflets; flowers rose-coloured or white, disposed in heads. The leaves are frequently sensible to touch, as in the Sensitive Plant. The species are very numerous.—*Eng. Cyc.* Of this genus of plants, many are to be found all over the country, the leaves of some of the species are remarkable for being sensitive to the touch. The pink and yellow flowers of one of the small shrubby kinds are particularly beautiful in the rains, readily grown from seed in any soil.—*Riddell*.

(5349) MIMOSA, OR WATTLE-BARK, is procured from different species of mimosa, which grow in Australia and New Zealand. It is sometimes imported in the form of fluid extract, as well as bark. The leather produced by its means is of good quality, but of bad colour. The bark must be finely ground, or it does not give up the whole of its tannin to warm water.—*Simmonds*.

(5350) MIMOSA ABSTERGENS, SOAP NUT. Roxb.

The fruit.

Seekayah, TEL.	Seeyakkoy, TAM.
Seeka kai, HIND.	

The leaves.

Shee a kai elley, TAM.	Sheeika akoo, DUK.
Sik kai ka paat, DUK.	Ghodasala, SANS.

This is a long, flat pod or legume, containing separate, small, oval, dark coloured seeds, and is considered by the Native Practitioners as a most valuable medicine. In taste it somewhat resembles the soap nut, but is more acid, less bitter, and has a singular pungency. Its qualities are said to be deobstruent and detergent; and I am inclined to believe that it is also an expectorant. It is commonly prescribed by them in cases of Jaundice and other biliary derangements, and is, besides, used by them like the soap nut, for washing the head. The small leaves of this prickly shrub have a pleasant acidity, and are frequently put into pepper water, when it is found necessary to keep the bowels open or work off bile. The pod is usually prescribed in electuary, in doses of about the size of a small walnut, every morning for three days.—*Ainslie's Mat. Med. pages* 111 *and* 260.

(5351) MIMOSA ADENANTHERA.—The unarmed mimosa. Nat. Lajwanta species.

(5352) MIMOSA ALBA.—The white Mimosa.

(5353) MIMOSA PUDICA.—The Sensitive Plant.

Lajuk Hind. | Total vadic. Tam.

Common in gardens, and grows readily from seed, color of the flowers pale pink.—*Jaffrey. M. pudica* has a prickly herbaceous stem, with the petioles and peduncles more or less beset with stiff hairs or bristles; leaves somewhat digitately pinnate, with 4 pinnæ, each pinna bearing many pairs of linear leaflets. It is a native of Brazil, and is commonly grown in gardens under the name of Sensitive Plant, the leaves falling on the slightest touch. The roots of this plant and its allies emit a most offensive smell, resembling the odour of a sewer at the time of impending rain. —*Eng. Cyc.*

(5354) MIMOSA SAPONARIA. The legumes of *M. saponaria*, according to Royle, form considerable article of commerce in India on account of their saponaceous qualities. [Sensitive Plants.] (Lindley *Vegetable Kingdom*; Don, *Dichlamydeous Plants.*)—*Eng. Cyc.*

(5355) MIMOSA PROCERA.

Padda Patseroo, Tel.

A Native of Coromandel where it grows to be one of their largest trees. *Roxb.*—*Rhode M.S.S.*

(5356) MIMOSA SCANDENS.—The climbing Mimosa. —*Riddell.*

Gela, Hind. | Gilla tiga. Tam.

(5357) MIMOSA SENSITIVA, the Sensitive Plant, has prickly stems and petioles; leaflets ovate-acute, dotted, with adpressed pili beneath, but glabrous above. It is a native of Brazil. The flowers are rose-coloured and tetrandrous. The leaflets are sensitive to touch, but not so much so as the following species.—*Eng. Cyc.* This vegetable wonder will grow in almost any situation and soil, raised easily from seeds.—*Jaffrey.* In Tenasserim, where "garden flowers grow wild," near deserted habitations the pink globular heads of the sensitive plant may be often seen peeping through the grass. It is cultivated by the Burmese, and is quite naturalized.—*Mason.*

(5358) MIMOSA XYLOCARPA.

Conda Tungedoo, Tel.
Malei Avarei, Tam.
Betada swamamki Vriksha, Can.

It is called Pingadoo in Pegu where it is used for knees, crooked timbers &c. in ship building. A large stately timber tree: a native of various parts of India. It blossoms during the hot season, at which period it is nearly destitute of foliage. The timber is remarkably strong and durable—*Roxb.* In the Vizagapatam district this wood is used for common purposes, it generally is faulty in the centre, it is not a bad wood for furniture, is well adopted for handles of tools &c. the average size at Vizagapatam is 12 inches in diameter and fifteen feet long; on the Godavery it is seldom obtained exceeding 8 inches in diameter and generally is faulty in the centre; it is used for posts.—*Rhode M. S. S.*

(5359) MIMOSEÆ, a sub-order of Plants belonging to the natural order *Leguminosæ*, whose flowers are regular, the stamens long, usually indefinite in number, and hypogynous, and the flowers valvate in æstivation. They are in many cases polygamous, and their leaves are always more or less compound. The principal genus of the division is the *Acacia. Mimosa* itself consists of a considerable number of species many of which are remarkable for the irritability of their leaves, a curious property which has always rendered them objects of interest. [Sensitive Plants.] The species commonly cultivated for the exhibition of this phenomenon is the *Mimosa pudica*, a South American annual. Among the useful plants belonging to *Mimoseæ*, and not included in the genus *Acacia*, are the *Inga sapida, I. dulcis, I. biglobosa*, and some others, whose pods contain a sweet nutritious fæcula, which renders them fit for food: and several kinds of *Prosopis*, the astringency of whose pods and bark renders them valuable for tanning purposes. In general, in the northern hemisphere, *Mimoseæ* are confined to tropical countries, or to those which have a high summer heat: but in the southern hemisphere they extend beyond such limits as in Van Diemen's Land, where Acacias, called Wattles, are the commonest wood. [Leguminosæ.]

(5360) MIMULUS. Scrophularinæ. Monkey flower.—*Riddell.*

(5361) MIMULUS CARDINALIS. These plants are well suited for flower borders, the colours are chiefly blue, red and yellow, easily grown from seed in any garden soil, it takes its name from *Mimo*, an ape, the seed bearing some resemblance to the face of a monkey.—*Riddell.*

(5362) MIMUSOPS ELENGI. Sapotaceæ.

The Tree.

Maghidam marum, Tam.
Taindoo or Bacul, Mulsari, Duk.
Pogoda mannoo, Tel.
Moogali mara, Can.

An ornamental tree with dark green oblong alternate leaves, and white fragrant flowers; common.—*Wight.* A tree of moderate size, cultivated for the oil obtained from its fragrant flowers. The wood is little known. Wight No. 40, Mysore 23,33, Nellore 87, Travancore 209, Rajahmundry 54, Hort. Gard. 54.—*M. E. J. R.* The quality of the wood, says Mr. Rohde, is unknown to me, and, being so much a cultivated plant, it is not probable that it is much used and is therefore little known.—*Rohde.* This species of mimusops, a rare ornamental tree, is much valued by Burmese ladies for its small delicate sweet-scented blossoms, which they string in chaplets for the head.—*Mason.* It thrives well at Ajmeer, growing to a large size, the flowers are delightfully fragrant, and the wood is very hard and durable, the foliage is beautiful and evergreen. The berries are eaten sometimes by the poor. This tree would be very ornamental in compounds.—*Gen. Med. Top. p.* 190.

(5363) MIMUSOPS ELENGI. Lin. Colebr. 92.

The Flower.

Maghadam poo, Tam.
Poghada, Tel.
Bolsarika pool, Duk.
Mulsari ka pool, Hind.
Bacula. Sans.

The small pale brown sweet smelling flowers of this most beautiful and ornamental tree are celebrated in the puranas and even placed amongst the flowers of the Hindoo paradise.—*Ains. Mat. Med. p.* 158.

(5364) MIMUSOPS OIL. Mimusops Elengi. A medicinal oil, obtainable in tolerably large quantities in some parts of the country. At the Madras Exhibition of 1855, it was exhibited by W. E. Underwood, Esq. as a new oil, but is known in England.—*M. E. J. R.*

(5365) MIMUSOPS HEXANDRA.

The Tree.

Pala marum, also patta, Tam.
Rajun, Hind.

This is a tree common in the Deccan, and is generally planted by the Mussulmans with the Elengi; the wood is much used where strength and toughness are required; the fruit is eaten by the natives —*M. E. J. R. Riddell.*

(5366) MIMUSOPS HEXANDRA. Roxb.

The Fruit.

Palay pullum, Tam.
Keernie ka pull, Duk.
Pala pundoo, Tel.
Cheerie, Sans.

This is the olive shaped reddish colored fruit of a very large tree. It is eaten (but not much sought after) by the poor, and grows in the woods of the Northern Circars.—*Ainslie, p.* 229.

(5367) MIMUSOPS KAUKI, Obtuse-leaved Mimusops.

Kirnee, Hind.

Cultivated at Ajmeer and Kotah, the tree becomes very large and is very handsome, the small fruit is eatable, the wood is fine-grained and hard.—*Irvine, page* 190. In the Deckhan, this tree grows to a large size, and is generally planted in groves: the fruit, which is about the size of a small olive, is of a yellow color when ripe, after the rains, and contains a sweet clammy juice, eaten chiefly by the Natives.—*Riddell.* This dried fruit is occasionally seen among the Chinese, brought from Singapore, and some of the seeds produce trees, which, judging from their leaves, can be no other than that now under notice.—*Mason.*

(5368) MINERAL SPRINGS.

1. Sulphuretted.

Malacca, thermal (Ward).

Spring, 27 miles N. from Hazareebagh, thermal, (H. H. Wilson).

Bum Buklesir, thermal, 16 miles, W. and S. of Sooree in Bheerbhoom, (Sherwill).

Jorya Booree, not far from Channeh, near meeting of Barakur and Damooda rivers, thermal (Oldham).

Tantloie near it, on other side Damooda, thermal.

Tata Pani, Sirgoojah, Chota Nagpore, thermal (Breton).

2 springs at N. base of Maha Deo Mountains, Nerbudda, thermal, (Spilsbury).

Well at Gwalior, (Col. Todd).

Below Landour, (Murray).

At Sonah, 30 miles from Delhi, thermal, (Ludlow).

At Lousah, in Noorpore, (Marcadieu).

At Bishisht in Kulloo, thermal, (Gerard).

In the Bukh Ravine Salt Range, thermal, (Fleming).

At Jubba in Salt Range, 10 miles E. of Indus (do.)

Chihalee Pass W. of Indus below Kalibag, (do).

Mittah near Esau Khail W. Bank of Indus (do.)

Peer Mungal and Gazee Peer in Scinde, thermal, (Major Baker and Lt. McLagan.)

At Lukkee Pass, near Sehewan, thermal, (Gibson).

Within high water mark in Kuttywar, (Sandwith),

Temple of Somnath in Guzerat, (Col. Todd.)

Arowlee in the Concan, thermal, (Duncan).

At Bhadrachellum on the Godavery, thermal, (Heyne, Malcomson).

At Chittoor, slightly thermal, (Hardy).

2. SALINE.

Several springs at Sooroojkoond near Belcuppee and Burkutta, Grand Trunk Road, (Sherwill and Hooker), thermal.

Tevah in Kangra district, (Marcadieu).

Mukhdoor Rusheed in Moultan, (Edgeworth).

Shahpore near Jhung, (Neelmadub Mookerjee).

Lahard Khad on Sutledge above Roopur, (Wade).

Universal throughout Salt Range, (Fleming).

Sumoondur and Kullur kuhar lakes in Salt Range? (Fleming).

Doozcekoostuck Scinde, thermal (Viccar).

Ooch Scinde, (Viccary).

Lukkee Pass, (Gibson).

Well at Banda? (Prinsep).

Near Hyderabad Deccan, (Voysey).

a. brine.

Sambher lake?

Many springs in Salt Range, (Fleming).

Old spring near Jeypore in Assam?

Brine springs in Becaneer and Jessulmeer, (Irvine).

Cachar Hills.

Peer Mungul Scinde, (Baker and McLagan).

b. alkaline.

Loonar lake, 50 miles from Jaulnah, (Malcomson)?

At Mean Meer, and others in Punjab, (Baddely).

Kairi water, or Soda water wells in Ajmeer, (Irvine),

Well at Jowali Mookhi? (Marcadieu).

c. aluminous.

Well below Landour, (Murray).

d. iodine.

Traces of iodine in well at Jowali Mookhi and Arlun in Kangra, (Marcadieu).

Ditto Thunga Bara near Hurripore, (ditto).

Strong iodide of potass well at Jowali, [Mr. Marcadieu states, that though bronchocele is very common in the district—the inhabitants of Jowali are exempt from it.] (do.)

e. lime.

Many in Murree Hills above Rawul Pinddee, (Fleming).

Peeth in Halla mountains thermal, (Viccary).

Kye in ditto, thermal, (A. Young).

Near Sunjabundia, Kurnool, thermal, (Newbold) temperature decreasing.

f. silicious.

Burrare and Bheem Bhand, Kurruckpore Hills thermal, (Sherwill and McClelland).

3. CHALYBEATE.

At Dallhousie, Chumba, (Clemenger).

Rhotas near Jhelum, (Fleming).

Bakh ravine in Salt Range, (ditto).

Chibalee, W. Bank of Indus, (ditto).

At Munnee Karn, (Edgeworth).

At Nageonda, Simla hills, (ditto).

Below Landour, (Murray).

On Rungeet river, Darjeeling (Liston).

Rungnoo river, 4 miles E. by N. of Darjeeling, (Withecombe).

Bangalore, (Garrard).

Ramandroog hills near Bellary, (Mayer).

Near old town of Attaran, Moulmein thermal?

4. THERMAL SPRINGS WITH NO IMPORTANT INGREDIENTS, OR IMPERFECTLY KNOWN, SOME OF THEM PROBABLY CARBONATED.

Hot springs at Cannea in Ceylon. Temp. variable?

Hot water fountain at Tavoy,
Ditto at Lunkyen in ditto, } Prinsep.
Ditto at Sienlee in Martaban.

Near Kaline Aurig Martaban, (Low.)

Hot spring on Attaran river Tenasserim, (Piddington).

Hot springs on the Palouk river and at Pee, between Mergui and Tavoy, some sulphuretted, (Major W. McLeod).

Springs at Numyan near Prome.

Between Meeaday and the Arracan hills, (Phayre).

Seetacoond, near Chittagong.

Utteer, 30 miles from Poorie, (Brander).

Kaljhurnee, Maharoo, Hatbulleah, Noubhil, between Rajamahal and Sooree (Sherwill).

Lacarakoonda 21 miles S. W. of Sooree in Beerbhoom, (Sherwill).

Tantlooee 16 miles N. W. of Sooree, on Sidh Nulla, (Sherwill).

Springs at Katkamsandi, old Benares Road, (Everest).

Pinarkoon, Ramgur, (Breton).

Seetacoond, Monghyr.

Paharpoor, Kurruckpore hills, (Sherwill).

Rajgeer and Guriuk, N. by E. of Gyah, (Sherwill).

On Rungeet river, (Darjeeling Guide).

Near Bagin river in Pana district Bundlecund, (Franklin).

Two hot springs in Alwar country, one 15 miles W. by S. from Alwar, one 20 miles N. E. of Jeypore, (Capt. Bellew's survey.)

Mineral springs at Machery? (Col. Todd.)

At Seetabaree, in Harowtee, also cold springs, (Col. Todd).

At Jumnootrie, Gungootrie, Kedernath, and at Badrinath, in Ghurwal.

Hot springs near Nutpa, Booktee and Jauree, valley of Sutledge, (Gerard).

Opposite Sonee banks of ditto, (Prinsep).

Hot spring at Silol, Kangra, (G. T. Survey).

Munneekarn in Kulloo and hot spring further up the Parbutti. (Mr. Edgeworth informs me that the water where it issues from its source, is of the temperature of 207° Fahrt. It is therefore one of the hottest known springs.

Some of the hottest of these are the Geysers 180°, Sooroojkoond 190°, the Petersquelle in the Caucasus 195°, spring on Palook river 196°, and what Humboldt discovered and describes as the hottest spring in the world, Guanaxuata in Mexico 207°. The boiling point of water at the elevation of Munneekarn is much below that point. Rice is cooked in the spring at Jumnootrie 194°, at about 11,000 feet above the sea, and in many others of inferior temperature.)

Kulat in Kulloo, (Gerard).

Lower range of Sooliman mountains, (Fleming).

Peer Muggen Alligator Tank, 13 miles from Kurachee, (Carless).

Jungun and Deyrah, N. Scinde, (Kirk).

Springs at the base of the Halla mountains, Scinde, (A. Young).

Oonee, Central range of Kuttywar, variable temp. (Gibson).

Oonopdeen and Soonoopdeen in Satpoora Range, (Briggs).

From near Surat to Rajapore many hot springs, at Mahar, Rutnaghery Mat, &c. more than 12 in number (Duncan.)

At Kair and Urjunnah, Deccan, (Malcomson).

At Byorah (Malcomson).

5. Petroleum.

Pegu ?

Arracan, Paidong 5 miles from Ramree (Bogle).

Island of Cheduba.

Assam, at Jeypore and five other places, (Hannay).

Sylhet, (Inglis)

Kaffir Kote, Algud ravine W. bank of Indus, (Fleming).

Jubba, N. side of Salt Range, 10 miles E. of the Indus, (do.)

Jowali Mookhi, (Gerard).

Three springs in Dooloo, eastward of Gogra, (do.)

Principal Authorities.

Bengal Transactions Medical and Physical Society.
Bombay Medical Transactions.
Gleanings of Science.
Journal of Asiatic Society.
Transactions of ditto.
Ditto of Bombay Geographical Society.
McClelland's Journal of Natural History.
———— Geological Report.
Ainslie's Materia Medica.
Madras Medical Topographies.
Kirk's Topography of Scinde.
Irvine's ditto of Ajmeer.
Oldham's Report.
Darjeeling Guide.
Todd's Rajpootana.
Phillip's Geology.
Proceedings of Geological Society.
Madras Road Book.
Hooker's Travels.
Gerard's Kunawur.

The preceding list, which, though a rude general classification has been attempted, has no pretension to being any thing more than a catalogue, includes, it is hoped, most of the mineral sources in India and its dependencies, of which accounts have been published. The names attached to the notices have been added; generally they are those of the discoverers, or rather describers; but in some instances of the analysers of the waters. Some springs, such as the Monghyr Seetacoond, have been so long known, that it is uncertain who the original describers were. A few have been communicated to me by friends. I have to acknowledge my particular obligations, to Capt. Sherwill for information about the Rajmahal and Bheerbhoom springs, to Mr. Edgeworth about those in Kulloo, Dr. Fleming the ones in the Salt Range, and Mr. A. Young those in Scinde. About 30 springs are believed to be here noticed for the first time. Major Sanders gave me some valuable information from the Maps in the Quarter Master General's Office: and I also was kindly allowed access to the Surveyor General's Office. I have thus, although I cannot hope to have escaped mistakes, been able to verify most of the localities, which in many instances, owing to strange transmutations of names, has been no easy matter. Three or four are from the records of the Foreign Office and Medical Board. It seemed useless, with reference to the generally imperfect nature of most of the observations, to attempt to include an abstract of such analysis as have been made, or even a record of the temperature of the thermal springs, or of the nature of the rocks or soil from which they issue. This was the less necessary, as it is understood that these points will be fully investigated in the course of a general inquiry about to be made by order of the Government of India. Petroleum wells have been included in the list, as they are of some commercial value, although they perhaps cannot properly be called *mineral* springs. Their medicinal use, which is known to the Natives of India, is also now almost abandoned except in some cutaneous affections. Even in the present imperfect state of our knowledge of the mineral waters of India, a few points of interest are suggested by the table, which I shall now consider. What districts are richest in mineral waters? These appear to be, the Tenasserim Provinces, a district round Hazareebaugh stretching in almost every direction for about 130 miles, in many places literally teeming with hot springs, the upper part of the Jullunder Doab, or rather the hills beyond its Northern boundary, the salt Range, and Northern and

Western Scinde; next is the Concan, and, though not to be compared with any of the foregoing, the peninsula of Guzerat. The deficiency of mineral sources in the Southern portion of the peninsula of India, and throughout the great central trap formation, is remarkable. They are found at every elevevation, from within high water mark to a height of 12,000 feet. What kinds of mineral waters are most common? More than half of those in the Table are thermal. The most frequent of all appear to be the Hot springs without any very strong mineral impregnation, which are so abundant in the Tenasserim Provinces, and in the Hazareebaugh districts, in some parts of the Himalaya, in the Concan, also in Scinde, where, as in many other places, an impregnation with carbonate of lime is common. One or two such have been found in Rajpootana and the Deccan. The Sulphurous Springs, appear to be pretty equally diffused; several in Hazareebaugh, some in the Nerbudda, some in the Concan and Guzerat, some in Scinde and the Salt Range, many at the base of the Himalayas, and in the upper part of the Jullunder Doab. Only one has been noticed in the Madras Presidency, (Chittoor is scarcely an exception to this,) and no true one in Tenasserim. The great majority of them are thermal. The Saline springs are chiefly found in Scinde and in the higher portion of the Punjab; they usually contain common salt with some sulphate of soda and small quantities of other salts, when they are not simply brine. Traces of iodine are found near Kangra. Throughout Rajpootana and in some parts of the Punjab, the wells are abundantly impregnated with soda. Some of the springs in Kemaon contain mineral impregnations, but scarcely to an extent to be considered saline. Scarcely any strong saline ones are thermal. The few thermal salines are chiefly calcareous, and one or two silicious. There appears to be a general deficiency of Chalybeates, and there is no one district in which they have been found more frequently than another, unless the outer ranges of the Himalayas; the wells in the Neilgherries are said often to have a trace of iron. None of the Indian chalybeates are thermal, and none of those known, except that at the beautiful spot Nagconda, appear to be strong ones; but it is difficult to suppose, especially with reference to there being no want of iron in India, that other sources of this description and of more powerful virtues will not be discovered. I am told there are many undescribed chalybeates in the Himalayas. The Murree hills contain scarcely any, and it is to be hoped that the one at Chumba, may prove of value. It is much to be regretted, that none of the agreeable Acidulous carbonated waters, such as the Selters, commonly called Seltzer water, which are abundant in some parts of Germany, have been found in India, where they would be so grateful. Some of the thermal springs, as the Seetacoond, at Monghyr, the water of which is highly prized and often carried on long voyages, are probably slightly carbonated, and observers talk of Indian springs effervescing, for instance the so-called chalybeate at Bangalore. When, however, it is considered, that almost all the strongly carbonated Springs in other parts of the world are found in the neighbourhood of extinct volcanoes, as in Auvergne, the Rhine Provinces, the Caucasus, or near active ones, as at Ischia, they are scarcely to be looked for in India. [Hot springs are not necessarily indices of volcanic action; they are most common at points of great displacement of strata, or at the junction of stratified and unstratified rocks. There seemed to be no sufficient grounds for considering the Loonar lake volcanic. Former observers could not discover scoriæ or lava, but it appears that Dr. Bradley in 1851 found both, See a paper by Dr. Buist in Trans. Bombay Geogr. Society, from which I have got much useful information. He has collected a large list of thermal springs, and connects them with volcanic agency.] By analogy, some might be expected to be found in Arracan,or in the Pegu and Tenasserim Provinces, the first being, and the other two being nearly included in the belt of volcanic action that runs up the eastern side of the Bay of Bengal, terminating in Barren Island and the mud volcanoes; but I never heard of any when I was stationed in Arracan, although I visited some of its volcanoes. I may now inquire how far these waters have been had recourse to, by the natives of the country, and to what extent they are likely to be of use to Europeans? In the great majority of instances, they have only been regarded by the natives of the country as emanations of the deity, and as objects of poojah or worship. Wherever there is a hot spring, there is pretty sure to be a temple, visited by pilgrims. Many have, however, been used medicinally. Some of those, which appear to be most resorted to, for their healing virtues, are the springs at Malacca, those at Sonah near Delhi, where considerable buildings have been erected for the convenience of bathers, at Munnee Karn, and at the Lukkee Pass. All of them are thermal, and except Munnee Karn, are sulphuretted, and natives have undoubtedly faith in them in certain cases. Such springs might easily at a small expense be made more extensively useful to natives. Europeans can scarcely be said to have ever made a fair trial of any of the mineral springs of India. Mr. Ludlow in 1826, suggested that the wells at Sonah should be made use of for European soldiers. Dr. Murray's spirited attempt in 1843-44, to employ the sulphuretted and chalybeate springs in the valley below Landour for the benefit of the Invalids at that sanatarium, never, I think, met with the support it deserved, and the situation of the springs at the bottom of a hot and confined though picturesque valley, was a very important obstacle to success. In 1846 I found them all but abandoned. That more attempts of the kind have not been made, that springs of as high virtues as those so prized in Europe, should have been neglected, must no doubt be a matter of surprise to people who have not visited India, to foreigners, to whom of all but the poorer classes a visit to a bath is a yearly necessity, and to Germans, who publish annually some 30 new works on their watering-places, but not to those who are aware of the many practical difficulties to be contended with in this country. It is not, however, generally known in Europe, nor indeed in this country, that mineral springs are so abundant in the East. Above 100 separate localities have been included in the Table, and it would be easy to extend the list, if I were to insert waters beyond the bounds of British India. There are hot springs in Ladak, Nepal, and Sikkim; at Uchebul in Cashmeer, and hot sulphur springs near Rajourie, in Goolab Sing's territory. See Cunningham's Ladak, Hooker's Travels, Mrs. Hervey's Travels &c. In what direction are we to look as the most favorable one for the establishment of a spa in India? The mere absence of strong ingredients in the water, as in the Tenasserim and many of the Hazareebaugh hot springs, would be no essential obstacle to success in their use, for some of the popular European baths, as Matlock, Wildbad, Pfeffers, and Bad Gastein, are very deficient in salts, yet are found efficacious in many affections, being chiefly used for bathing. But the absence, at most seasons of the year, of a bracing climate, at the generality of the thermal springs in India, diminishes the chance of their ever proving of utility to Europeans. Perhaps the climate of Hazareebaugh, which is 1,500 feet above the level of the sea, alone offers something of an exception to this remark. Fortunate indeed might it have been for the denizens of Calcutta, if the mountain of Parisnath, in that district, only 150 miles off, were adapted for a sanatarium, and if some of the mineral springs which are so abundant in the adjacent country, had been discovered in its clefts. But all evidence goes to show, that the space on the ridge at its summit, is far too limited for more than two or three bungalows, and there would be much difficulty in procuring a proper supply of drinking water for any number of people. Besides, it is very doubtful whether in the plains of Bengal, its height, although equal to Mahableshwar, about 4,500 feet, is a sufficient elevation for a sanatarium. The opening of the Railway to Raneegunge will bring two or three sulphuretted springs within reach of Calcutta. That at Chaunch is only twenty miles from the terminus, and about three miles off the Grand Trunk Road. It is prettily situated, not far from the Pachete hills, and there is a colliery near. But there is a much more abundant and hotter one called Tanloie, on the banks of the Damooda, two or three miles off. Those at Bum Buklesir are about 15 miles from Mungulpore, and the same distance from Sooree: they are further off the high road, but are more powerful and abundant. The hot spring at Lakarakoonda is not far off, and there is said to be another near at Kisshun. The elevation of all them may be about 300 feet above the sea level. The Europeans resident at the Collieries count the district healthy, except during the rains. Of these places, Bum Buklesir, is particularly deserving of an early investigation, for no analysis of its waters has yet been made. There are four or five springs: the temperature at least of the hottest, which is 162°, exceeds that of the most popular springs of the kind, Aix-la-Chapelle, or Bareges and Cauterets in the Pyrenees. During the four cold weather months the climate is probably not inferior to that of any of those places in their short bath season. Indeed, but for the peculiar arrangements of society in India, depending on Europeans being birds of passage, and not colonists, but for the absence here of any season of general relaxation from business, these wells might, for all I can see to the contrary, that is, if there be no local objection to them, have long ago been found of much utility to the inhabitants of Calcutta. The truth is, the facility of communication with England and of going to sea, enjoyed by Calcutta people, has led to indifference about the sanitary resources of the country, and to the neglect of Cherra Poonjee and Darjeeling, or rather to their never being fully appreciated, and to the abandonment of the only sanatarium they had on the sea-coast, Poorie; not that it was ever in very high favor. A few of the residents of Cuttack still go there, during the hot months, but I never hear of any one visiting it from Calcutta. In fact, sea bathing, or any other kind of bathing, except for purposes of ablution, is scarcely known in Bengal, and probably not much practised in any part of India. Swimming baths are scarcely an exception to this statement. Yet how refreshing is the following description, extracted from the dry Madras Road Book—"Cootallum (not very far from Cape Comorin) is a large place with several bungalows close into the hills. The well known cataracts are close at hand. The lowest cataract falls from a height of 200 feet. The average temperature of the water is 72° to 75°, and invalids derive great benefit from bathing in it. The bathing-place is under a shelving rock, affording the most delightful shower-bath possible. The climate is particularly enjoyable to Europeans in June, July and August. The scenery is splendid; there are in all three falls, the highest being 2,000 feet above the sea." Amherst, too, or Negrais, should either be hereafter employed as a sanatorium, may indeed be useful to the occupants of our new provinces, but will never be any great resoure to the inhabitants of Bengal. Of Negrais in particular a very favourable account appeared in an interesting article in the *Calcutta Review*, five years ago. Negrais has since then been reoccupied, but not exactly in the way anticipated by Mr. J. R. Martin, when he wrote on the subject. But, to return from what would have been a digression, if sanatoria and watering-places were not so intimately connected with each other, if we look next to Scinde, which abounds in mineral waters, the situation of the province and its climate alike preclude the hope of their ever being extensively useful to Europeans, though they might be more employed for sepoys, and the people of the country. There is also no great prospect of any of the other wells in Bombay becoming available. The thermal springs of the southern Concan do not appear to be powerful, and they have no advantage as to climate. For Madras there seems to be no hope, but in making the most of the chalybeates at Ramandroog. The European Regiment and Artillery might well be moved there from Bellary—so far, at least, as one without local knowledge can judge. There is table land 3,198 feet above the sea; climate cool, invigorating and healthful, 13° to 14° cooler than Bellary; the table land is 2,735 yards long by extreme breadth 996 yards. The climate must make the sulphur springs of Bhadrachellum useless for Europeans, even if in other respects they were promising. What then is the Land of promise? The higher portion of the Jullundur, a tract abounding in mineral wells of all descriptions, where the icy stream of the Parbuttie, close to the boiling fountain of Munneekarn, which rises in a jet at an elevation of 5,587 feet, could furnish Russian baths, if they were desired, and where the immediate vicinity of a chalybeate is not to be forgotten: where some are reported to contain Iodine or Bromine (the asserted presence of less than $\frac{1}{3}$ of a grain of bromide of potass, with the merest trace of iodine, in 16 ounces of the water, was the making of the Saline of Kreutznach), and where some must possess the advantage of an almost European climate. In this district also and on the Banks of the Beas, is Bishiht, at an elevation of 6,681 feet, with an ample thermal sulphuretted source. After touching on the subject of the use of grapes, Dr. McPherson continues; but to get grapes in abundance, (and the vine blight has not yet reached Asia,) they would have to proceed further into the Himalayas than any of the springs I have enumerated, beyond the influence of the periodical rains, to the beautiful valley of Chinee, of which Mr. Grant has furnished so pleasing an account, and where he describes the grapes as being plentiful, excellent, and exceedingly cheap. There too may yet be found sources of value, for Gerard says, there are a few mineral springs impregnated with salt, iron and alum, that may possess medicinal virtues, and the famous wells of Zungsum, at the meeting of the Speetee and Parati rivers, 4 miles North of Shealkhur, where inscriptions in the Tartar language on tablets of stone describe the particular virtues of each spring, are scarcely beyond the limits of Kunawur.

Bum Buklesir.—So interesting does this locality appear to me, with reference to its vicinity to Calcutta, that I do not hesitate to add to this paper some detailed information respecting it, which I owe to the kindness of Capt. Sherwill. Dr. Sheridan of Bheerbhoom has had the kindness to write me an account of a recent visit to the springs. It tallies with Capt. Sherwill's; only one went in the rains, when the country was under water, the other in the cold weather. Bum Buklesir is a pretty and curious spot, easily accessible. It is healthy and not jungly, being situated in a well-cultivated country, with a little jungle to its South. It is one mile from the large town of Tantipara, on the banks of a small nullah, called the Buklesir. There are five or six hot springs, the whole group called Bum Buklesir. The hot wells that have been surrounded with masonry walls are immediately on the North or right bank of the nullah. There are numerous hot springs in the bed of the nullah only to be seen in the dry season, giving out the well-known smell of sulphuretted hydrogen, with which the air is tainted. Near the hot springs there are several cold ones, all flowing from a tough gneiss rock. The hot and cold springs are only separated by a few feet from each other. The body of water ejected from the hottest well is very considerable, being about 120 cubic feet per minute; it runs from innumerable small orifices in an accumulation of mud and dirt, the rock being nowhere visible within the masonry of the tank. In the hottest water 162°, a green shining conferva thrives. Another spring is 128°, and the coolest 83°. Some 3 or 400 feet from the bank of the river, among the dilapidated temples, there is a large pucka tank which is supplied by two springs, one hot and the other cold; so that at one end the water is warm, at the other cold, and in the centre tepid. The stream of the nullah is about 50 yards across, with a brisk current, and it retains its heat below the springs for a considerable distance; its temperature was 83° in the month of December, when the temperature of the air was in the shade 77°. The sand of the stream some little way from the spring, and at the depth of six inches, is intolerably hot to the hand. Extending for about 200 yards along the right bank of the stream, are 320 small brick and mortar Viharahs or temples, built by various pilgrims, each containing a Priapus or emblem of Maha Deo. Only one temple has any pretension to architectural elegance. Numerous attendant Brahmins, who are most importunate beggars, loiter about the temples, engaged in bathing in the hot stream, or watching the cremation of dead bodies, which operation is constantly being carried on. Tantipara is a fine substantial village, with most of its inhabitants engaged in preparing silk for the Calcutta market; there is an indigo factory besides a police chokee and abkaree station; a short way off is the large town of Dobrajpore, offering a good market for English piece goods, and producing a large supply of fish from its numerous tanks. Between it and Bum Bucklers, and in the town of Dobrajpore, large naked and picturesque masses of granite and gneiss protrude through the soil, occupying altogether about a mile square. The scene is a very curious one, and there is a good view of the surrounding country from the top of one of the rocks, on which is a Grand Trigonometrical Station about 60 feet high. In the opposite direction, but further away, is Nagore or Jy Nuggur, a large town; the greater part of it has gone to decay, as is shown by its falling mosques, half-filled and weed-choked masonry tanks, and ruined buildings which almost approach to palaces in extent. The famous Nagore wall or entrenchment, extends in an irregular and broken figure round the town of Nagore, at a distance of about 4 miles; its length is about 32 miles. At Lakarakoonda, about 5 miles off, is a warm spring, temp. 85°. Near the feeble stream which carries away its waters is a curious Hindu cut stone temple, which is fast falling into ruin. I trust that I have quoted at sufficient length from Capt. Sherwill's interesting notes and reports to show, that if Bum Buklesir were fitted for the reception of European visitors, there is no lack of objects of interest in the neighbourhood.—*Dr. John Macpherson M. in No. iii, Indian Annals of Medical Science, page* 205, *Oct.* 1854.

(5369) MINT.

Hibbuk, Nana, Arab.
Baume Verte, Fr.
Pudcena, Nana, Guz.
Hind.

Frauen murze, Ger.
Menta romanna, It.
Nana, Pers.
Widdatilum, Tam.

A well-known leaf, chiefly used for culinary purposes in England, as well as in India, where it is easily grown. Mint is occasionally prescribed by Mahomedan practitioners in dyspeptic complaints, and to stop vomiting. Several kinds are distinguished, all remarkable for their peculiar odour and taste.—*Faulkner.* The common sorts are three, Spear-mint, Pepper-mint and Penny Royal. The first is generally used for culinary purposes: it may be propagated by layers, or cuttings, or parting of the roots; it requires a moderate proportion of water. In the rains a small black caterpillar attacks the leaves, and will destroy the whole bed if not removed by hand, or flooding the beds, when the insect becomes detached from the leaves, and is easily destroyed.—*Riddell.*

(5370) MIRABILIS JALAPA, Marvel of Peru. Belle de nuit.

Patrash, Tam.
Reso, Japan.

Gool bajee, or Gulabbas,
Hind and Duk.
Krishna keli, Beng.

Cultivated as an ornament in all the gardens of Bengal. Considered an aperient by the native doctors. Drs. Hunter and Shoolbred tried it without satisfactory results, and Dr. O'Shaughnessy's experiments lead him to believe it destitute of any efficacy. It is at best an uncertain cathartic. The roots of this plant were long regarded as the source of the true Jalap. They are considered purgative, their taste is acrid and nauseous, and they abound in starch; the seeds also contain this principle in such abundance that they have been proposed as an alimentary article. The Mirabilis dichotoma and longiflora are reputed to possess similar properties.—*O'Shaughnessy, p.* 511. This plant is very beautiful though very common, and known as the Marvel of Peru. The flowers are of various colours, red, white and yellow, also variegated red and white, yellow and white. The root when dried is prepared for medicinal use. It becomes in a short time quite a weed in a garden. Is propagated by seed, and in any soil.—*Riddell.*

(5371) MIRCHEE. Capsicum Frutescens. Capsicum.

(5372) MISHME TEETA. Golden thread-root of Assam. Roots of Coptis teeta.—*Beng. Ph.*

(5373) MISSEE, a powder made from gall-nuts: sulphate of copper; steel filings: myrobalans, and the pods or gum of the keekur tree: the Hindoo and Mahomedan women use it in staining the teeth black.—*Herklots.*

(5374) MISWAK, a substitute in India for a tooth brush, made from a twig of the Margosa: the rough acharantes: careya arborea, Phyllanthus multiflorus; and Palmyra.—*Herklots.*

(5375) MOCHA STONES AND MOSS AGATES are semitransparent calcedony, including various ramified forms, produced by iron, manganese, bitumen and chlorite or green earth, but sometimes also, as has been proved by Daubenton and MacCulloch, produced by the presence of real vegetable bodies, such as Confervæ and Mosses. The finest are found in Guzerat, but received their name from having been brought from Mocha, in Arabia.—*Eng. Cyc.*

(5376) MOCHEAL, the Tamil name of a Ceylon tree which is about twenty inches in diameter, and eight or ten feet high. It is used in native boats &c. It produces a fruit from which oil is extracted.—*Edye. Ceylon.*

(5377) MODEL OR PUTCHA OOTOO WOOD.

(5378) MOHAIR.

Moire, Fr.
Mohr, Ger.
Moerro, It.
Muc, Muer. Sp.

The hair of the Angora goat, famous for being soft, fine as silk, and of a silvery whiteness. It is made into camlets, &c.—*Faulkner.*

(5379) MOHUL WOOD.

Mohul, Hind.

(5380) MOHUNNANEE WOOD OIL.

(5381) MOHUR OR ASHRUFFE. A gold coin, of India, now rarely seen, of fifteen rupees value.

(5382) MOLASSES, TREACLE.

Melasses, Fr.
Syrup, Ger.
Kakwee, Guz Hind.
Meilazzodi zucchero, It.
Melasso, Port.
Patoka sacharnaja, Rus.
Meil de azucar, Sp.

The uncrystallisable part of the juice of the sugar-cane, separated from the sugar during its manufacture. It is of a brown or black colour, and a sweet taste. Molasses is used in preparing the coarser sorts of preserves, and on the Continent and in India, in the preparation of tobacco.—*Faulkner.*

(5383) MOLINDA CANESCENS.

Korive : Sapindus tetraphyllus, Tel.

A native of the Circar mountains ; flowers about the time the sapindus does. The wood of this tree is white and not so serviceable as that of the *Sapindus* rubiginosus. Roxb.—*Rohde, M.S.S.*

(5384) MOMORDICA, a genus of Plants belonging to the natural order *Cucurbitaceæ*, The flowers are monœcious, yellow or white ; the staminiferous flowers have a 6-cleft calyx, with very short tube, a 5-parted corolla, tridelphous stamens, with connate anthers ; the protilliferous flowers have three sterile filaments, the styles bifid, the ovary 3-celled ; the fruit opens with elasticity when ripe ; the seeds compressed, reticulated.—*Eng. Cyc.*

(5385) MOMORDICA CHARANTIA, CUCURBITACEÆ.

Kurilla, Duk.

(5386) MOMORDICA CHARANTIA.

Punney Fodaylang-kai, Tam.

This vegetable is very commonly cultivated by the natives at the commencement of the rains, the fruit is from ten to fourteen inches long, and from two to four in diameter; the edges are curiously notched and ridged, the flavour is bitter, and it requires to be soaked before being cooked.—*Riddell.* The green fruit used in curries, &c., it grows about 1 foot or 15 inches length, commonly cultivated, known by the name of small snake gourd ; before cooking it is generally steeped in salt water.—*Jaffrey.* In Tenasserim, two or three varieties of momordica, a fruit the size of a cucumber covered with tubercles, are used in curries.—*Mason.* In Ajmeer, cultivated in the rains.—*Gen. Med. Top. p.* 209. This is a creeper, sown at the commencement of the rains, and may be continued during the cold season ; it is a bitter fruit, very rough skinned, and from four to five inches long; the edges have a very wrinkled appearance ; when ripe it is of a beautiful deep red and yellow. The natives fry and eat them, but they are principally used in curries ; they require to be soaked in salt and water before dressing. They sell from one to two pice a seer.—*Riddell.*

(5387) MOMORDICA CHARANTIA, VAR. FRUCTIBUS OBLONGIS.

Comboo pagulkai, Tam.
Lumba carala, Duk.
Commoo Kakakaia, Tel.
Pandy pavel, Hort. Mal.
Deerga Karavullie, Sans.

This is a very valuable pleasant tasted and wholesome hot vegetable though perhaps a little too bitter. It is about four or five inches long and of a wrinkled and scabrous appearance outside. The natives sometimes make curry of it, but prefer it fried. In some parts of the country the Tamool name of this article is pronounced Comboo pawakia.—*Ainslie, p.* 238.

(5388) MOMORDICA CHARANTIA, *Var.* MURICATA.

Pavay-kai, Tam.

The bitter gourd. Commonly cultivated and used in curries, said to be very wholesome ; another fruit called Nerree pavay-kai, is sold in the bazaars, I have seen nothing but the fruit, and take it to belong to Curcurbitaceæ.—*Jaffrey.*

(5389) MOMORDICA DIOICA.

Angakara Gudda, Tel.

This is a smaller species and round-fruited, but differs little from the former : both are much cultivated by the natives for their curries.

(5390) MOMORDICA DIŒCA. DIŒCIOUS MOMORDICA. A species of momordica with small muricated fruit, is occasionally eaten by the natives.—*Mason.*

(5391) MOMORDICA MIXTA.

Gol-Kakra, Beng.

This is erroneously named *Makal* by Ainslie, and as he also by mistake applies the same term to the colocynth plant, many errors have originated in attempts to introduce the Indian colocynth into medical practice in India. The fruit of the Gol-Kakra is large, red, and thorny, contains a yellow insipid pulp, is totally inert as a medicine, and is indeed occasionally used for food in Bengal. *Makal* is the correct name of Trichosanthes palmata.—*O'Shaughnessy, p.* 349.

(5392) MOMORDICA MURICATA. Bura Hurela. HIND. cultivated.—*Gen. Med. Top p.* 209.

(5393) MONEY. The current and convenient principal coin of the Malay and Philippine Archipelagos is at present, and has long been, the hard Spanish dollar, the peso duro of the Spaniards; and that with globes and pillars, containing 3709 grains of pure silver, and worth in sterling money 5179 pence, has an universal preference. The English rupee and Dutch guilder are but of local currency and always, more or less, at a discount. The dollar, in the native languages, is known by various names; the Malays usually call it real, which is, no doubt, an "abreviation of the Spanish real de a ocho, or a piece-of-eight." The common name with the Javanese is ringgit, which literally means "scenic figure."—*Crawfurd Dict. page* 285. A great variety of small coins of brass, copper, tin and zinc are in circulation throughout all the islands. The most frequent of these is the Dutch doit, of which about 300 ought to go to a Spanish dollar. The intrinsic value of all such coins, however, having no relation to their assumed one, and being usually over issued, they are generally at a heavy discount. The small coins of Palembang, Achin, Bantam, and Queda are of tin. Those of the latter place go under the name of tra, which is, however, only the word "stamp" or "impression." Of these 160 are filed on a filament of ratan, of which 8 strings or 1280 coins are considered equivalent to a hard dollar. In Bali and Lomboc the currency consists of Chinese Zinc coins with a hole in the middle for filing them on a string, each string having 200, and five of these called a siah, that is, "one thousand," being the highest denomination of money in the reckoning of the inhabitants of these islands. Their value rises, and falls in the market according to the supply, like any ordinary article of merchandise; so that a Spanish dollar will sometimes buy 800 of them, but often as few as 500 only. All these small coins are generally known by the Javanese name of pichis, corrupted pitis by the Malays, a name which had extended to the Philippines.—*Crawfurd Dict. p* 285. The only native country of the Archipelago in which a coin of the precious metals seems ever to have been coined, is Achin. This is of gold of the weight of nine grains, and of about the value of 14d. sterling: to which European traders have given the name of a mace, a corruption of the Malay mas, itself a corruption of the Sanscrit, masha, the name of an Indian weight. All the coins of this description that have been seen are inscribed with Arabic characters, and bear the names of the sovereigns under whom they were struck, so that they are comparatively modern.—*Crawfurd Dict. p.* 286. Previous to the arrival of Europeans, the natives of the Archipelago generally, had no other coin than the small bits of copper, brass, tin, or zinc, already named. The Javanese appear to have coined some of their own money, as we find from many examples excavated from old temples, and other places.—*Crawfurd's Dictionary, page* 286.

(5394) MONGHYR, is celebrated for its iron manufactures, especially of muskets, in which respect it is the Birmingham of Bengal. Generally speaking, these weapons are poor, though stamped with the first English names. A native workman will, however, if time and sufficient reward be given, turn out a first rate fowling-piece. The inhabitants are reported to be sad drunkards, and the abundance of toddy-palms was quite remarkable.—*Hooker Him. Jour. Vol.* 1 *Page* 87.

(5395) MONITORIDÆ, OR MONITORS, a family of Lacertian Reptiles: the name Monitor has been given to the typical genus of this family in consequence of the supposed warning given by them of the vicinity of crocodiles. The warning of these Monitory Lizards was said to be a hissing or whistling; but the better opinion is, that they obtained credit for this monition solely from the accident of their haunts, which are for the most part in the neighbourhood of the waters, and consequently bring them sometimes into company with the destructive and gigantic reptiles above mentioned. The Monitors have teeth in both jaws, but none on the palate. Cuvier divides them into two groups, and Fitzinger into three, under the names of *Tapinambis*, *Varanus*, and *Psammosaurus*. Dr. J. E. Gray makes the *Monitoridæ* the first family of his *Leptoglossæ*, or Slender-Tongued Lizards. Character of the Family.—Head with minute polygonal shields; teeth adnate to the inner side of the jaws; tongue elongate, slender, retractile into a sheath at its base; scales small, roundish, placed in cross rings, those of the sides like those of the back; legs 4, strong; toes 3-5, compressed, unequal; thighs poreless; supraorbital plate bony. The species are inhabitants of the Old World, and frequent the banks of rivers. The Asiatic genera and species of the 'British Museum Catalogue' are as follows:—

Odatria Gray.—Nostrils ovate, longitudinal, sub-anterior; teeth compressed, acute. Tail elongate, round, not keeled above; scales large, sharply keeled, sub-spinose. Back with elongate narrow keeled scales. Ventral shield elongate. Toes rather unequal, elongate.

O. Timorensis (*Monitor Timorensis* Gray; *Tapinambis viridimaculatus* Daud.), the Timor Odatria. Black, yellow-dotted, dots forming rings and spots; head yellow and black-dotted. Scales over the orbits small, granular; of forehead larger. Ventral shields nearly as broad as long. Tail slightly compressed above, sub-triangular; base of tail unarmed. Is a native of Timor.

Empagusia, Gray. Nostrils large, oblong, oblique, in front of the muzzle. Tail as long as the body head, tapering, roundish, with a double-edged keel above; scales sharply keeled. Toes rather short, sub-equal. Teeth acute. Scales ovate, keeled. Head short.

E. flavescens, Gray (*Monitor flavescens*, Gray; *Uaranus Russelii* Sehlegel; *U. Piquotii*, Dum. et Bib.; *M. exanthematicus*, var. *Indica*, Sehlegel), the Indian Empagusia. Olive, with yellowish cross-bands. Head-shields sub-equal; eye-brows with a central series of larger plates. It is found in Nepaul.

Uaranus, Merrem.—Nostrils oblong, rather oblique in the centre, between the apex of the muzzle and the orbits. Tail elongate, compressed, with a double-edged keel above. Toes elongate, unequal, strong. Head elongate.

a. Shields over the orbits small, sub-equal.

U. heraldicus: *Monitor heraldicus*, Gray; the Heraldic Uaran. Black, with cross rows of pale-eyed spots; pale beneath; black-banded. Shields over the orbits small, sub-equal. It is a native of India.

U. lunatus, the Lunated Uaran. Nostrils large, nearly central; shields over the orbit small, sub-equal. Dark brown, with lunate bands directed backward on the neck and forwards on the body, and with cross-bands on the tail; belly and under side of tail whitish. It is found in India.

U. ornatus, the Philippine Uaran. Nostrils large, central; shields over orbit small sub-equal. Olive; neck and front of the body with pale-spotted broad black cross-bands; the hinder part of the body and tail with pale spots. It is a native of the Philippine Islands.

U. Dumerilii; *Monitor Dumerilii*, Muller; Dumeril's Uaran. Brown, with obscure cross-bands, with a black spot on side of neck. Shields of the head and over the orbit nearly equal, moderate. Scales large, convex. It is a native of Borneo.

U. rudicollis, the Rough-Necked Uaran. Nostrils large, nearer the orbit than the end of the muzzle; shields over the orbits nearly square, the hinder central ones rather larger. Scales of the back triangular, keeled; of the neck large, prominent. Muzzle elongate. Black, with white streaks on back of neck, and bands across the back. It is found in the Philippine Islands.

b. Scales over the orbit small, with a central longitudinal series of larger plates.

U. nebulosus (*Monitor nebulosus*, Gray; *M. nebulatus*, Sehlegel), the Coloured Uaran. Nostrils large, rather nearer the orbit than the end of the muzzle orbital shield with a large series; back of neck with converging dark streaks. It is a native of India.

c. Tail triangular, compressed, and with a doubly-toothed crest above. Nostrils small, round. Aquatic.

Monitor, Gray (*Polydædulus*, Wagler; *Uaranus*, Fitz.)—Nostrils small, round, in the, middle, between the apex of the muzzle and the front angle of the eye. Tail elongate, compressed, with a double edged keel above. Toes elongate, unequal, strong. Teeth rounded.

M. Dracæna, Gray (*Lacerta Dracæna*, Linn. *Stellio Salveguardia*, Laur.; *Tupinambis Bengalensis*, Dand.; *T. Indicus*, Dand.; *T. Cepedianus* Daud.; *Uaranus guttatus*, *U. punctatus*, and *U. Argus*, Merrem; *M, gemmatus*, Guerin) the Indian Monitor. Brown; black-spotted or yellow-eyed when young. Nostrils central; scales over the eyes flat, small, sub-equal; of the head rather larger. It is a native of India.

M. Gouldi Sehlegel (*Hydrosaurus Gouldii* Gray), Gould's Monitor. Neck with two yellow streaks on the side; scales over the eyes small, granular; of forehead larger. Ventral shields small, longer than broad. It is found in north-western Australia.—*Eng. Cyc.*

(5396) MONKEYS. The Chinese are skilful in teaching the smaller kinds of monkeys various tricks and persons carrying them around the country to entertain the populace with their antics are often met. Mr. Breton gives one picture of their adroitness and usefulness in picking tea in Shantung from plants growing on otherwise inaccessible acclivities which if not misrepresented rests on doubtful authority. One of the most remarkable animals of this tribe is the "done" or Cochin-chinese monkey (Simia nemæus) which is said to occur also in Kwangsi. It is a large species of great rarity, and remarkable for the variety of colors, with which it is adorned. Its body is about two feet long and when standing in an upright position its height is considerably greater. The face is of an orange color and flattened in its form. A dark band runs across the front of the forehead and the sides of the countenance are bounded by long spreading yellowish tufts of hair. The body and upper parts of the forearms are brownish grey, the lower portions of the arms from the elbows to the wrists being white, its hands and thighs are black and the legs of a bright red colour, while the tail and a large triangular spot above it are pure white. Such a creature matches well for its grotesque and variegated appearance with the mandarin duck and gold fish also peculiar to China.—*Williams' Middle Kingdom, p.* 247.

(5397) MONKEY BREAD TREE.—Adansonia.

(5398) MONKEY FLOWER.—Diplicus and Mimulus.

(5399) MONKSHOOD.—Aconite.

(5400) MONOCERA GRIFFITHII.— Monocera. In the southern provinces of Tenasserim, there is a species of monocera which bears flowers similar to the Elœocarpus.—*Mason.*

(5401) MOODOOGA OIL, Butea Frondosa. The seeds of this tree yield a small quantity of a bright clear oil, which is sometimes used medicinally —*M. E. J. R.*

(5402) MOOCHEE, Hindoo castes, in Bengal, shoemakers, or saddlers, in the Dekhan, painters, book binders, saddlers, &c.

(5403) MOOCHERUS. A gum resin yielded by the *Bombax Heptaphyllum.* It occurs in knotty, opaque, dark-brown pieces, often with internal cavities. The roots of this plant constitute the *Suffeid mooslie* of the Indian bazars. Vide article Mooslie White, is a laxative and as such given to children.—*Faulkner.*

(5404) MOONJA, Saccharum Moonja, a grass indigenous to India, it is collected after the rainy season, it is possessed of great tenacity and is employed for tying up cattle at night, for ropes for the Persian wheels : and the Benares and Indus boat-men make tow ropes of it, and it is used as rigging, in all the vessels above Sikkim. It would form an ample supply of half stuff for paper makers.—*Royle.*

(5405) MOOLAY KEERAY, Amarantus Polygamus, Lin.

Molay keeray, Tam,
Cholai baji, Guz.
Rujgheere, ke baujee Duk.

Molakoora, Tel.
Chuolaee, Hind.
Shakinee, Sans.

(5406) MOOLOKARANG VARAY PUTTAY; TODDALIA ACULEATA : Amarantus spinosus. Lin.

Moolloo keeray, Tam.
Cateahrajaheera ke baujee, Duk.

Mooloo Duntoo koora, Tel.
Cuntaka, Shakenie, Sans.

(5407) MOONG AROOD. Phaseolus Mongo. Green Gram. This is chiefly grown in the upper parts of Hindoostan ; it is eaten by the natives dressed in various ways.—*Jaffrey.*

(5408) MOONG PHULEE. Arachis Hypogæa. Earth-nut. Ground nut ; Manilla nut : the legumes contain the nuts ; they are small and white, and require to be roasted before eaten ; they are not in much esteem.—*Riddell.*

(5409) MOON STONE. Some of the "cat's eyes" that are brought for sale by the Ceylonese, are made of adularia or moon-stone, a variety of felspar found in Ceylon resembling opal. In Europe it is often sold for opal.—*Mason.*

(5410) MOORCH'HUL. A club-like fan, made of peacocks feathers, used by the great.—*Herklots.*

(5411) MOORDAR SUNG. Litharge is not made at Ajmeer, though there are lead mines : it is brought from Delhie : used in ointments and in oil paintings : two seers for one rupee.—*Genl. Med. Top. page* 146.

(5412) MOORIES, BLUE. These cloths are principally manufactured in the Districts of Nellore and at Coonatoor in the Chingleput Collectorate of Madras. They are 2 cubits in breadth, and 28 long and sold at from 2 to 7 Rs. each according to their sizes. They are largely exported to the Straits of Malacca.

(5413) MOORVA, MAROOL. Bow-string-hemp Sansevieria Zeylanica. Dr. Gibson states grows freely on the Bombay side of India.—*Royle Fib. Plant, p.* 337

(5414) MOOSLIE. Authors describe the source of this Indian drug, differently.

(5415) MOOSLIE, WHITE. Sufed Mooslie. Root of Bombax Malabaricum.—*Beng. Pharm.*

(5416) MOOSLI-SUFAID. Asparagus sarmentosus. The root of the plant is brought from Kotah, and via Pali : considered of a warm nature and given in purges and mesalihs.—*Gen. Med. Top. page* 145.

(5417) MOOSLI-SIYAH, Black root of similar shape and size comes from Kotah ; used in the same way, and considered stimulant and used as an aphordisiac.—*Genl. Med. Top. p.* 145.

(5418) MOOSLIE, WHITE.

Suffeid Mooslie, Duk. Guz. & Hind.

Tanneer-Vittaug,-Kalung, Tam.
Tsulla Ghedaloo, Tel.

The root of the *Bombax Heptapyllum.* It is long, fleshy, and whitish, and is used as food by the inhabitants of Ceylon, where the plant grows. In Southern, and some parts of Western India, the powdered root is used in the form of a thick mucilage with water, and answers admirably as a nutritious demulcent for convalescent persons. It is also supposed, when taken in this form, to have the effect of filling the small pox, and preventing the confluent disease.—*Faulkner.*

(5419) MOOSLIE, BLACK, Nelepanny Root.

Tal moolie, Beng.
Kalee Mooslie, Duk. Hind. & Guz.
Seeah Mooslie, Pers.

Warahi, Moosalie, Sans.
Nelepanny kalung, Tam.
Nalla tady gudda. Tel.

A tuberous and wrinkled root about four inches long ; it is slightly bitter and mucilaginous to the taste, and is reckoned among those medicines which purify the blood ; it also possesses tonic properties. It is procurable in most bazars throughout India.—*Faulkner.*

(5420) MOOTE KEERAY, Tam. This green Ainslie had never seen, nor did he believe that the Botanical name of the plant had been ascertained. It grows in the Southern parts of the Peninsula, and is eaten by the poor.—*Ainslie, p.* 255.

(5421) MORACEÆ, *Morads*, a natural order of Exogenous Plants which were formerly placed as a sub-order of *Urticaceæ.* The species are trees or shrubs, with a milky juice, sometimes climbing. The leaves are commonly lobed and rough. The flowers are small, monœcious, and collected in heads, spikes, or catkins. The ovules are solitary and suspended. The embryo lies in the midst of fleshy albumen, hooked, with the radicle long, superior, folded down towards the cotyledons. Although the Mulberry and Fig grow in Europe, all the *Moraceæ* are extra European. The species inhabit the temperate and tropical latitudes of both hemispheres, often forming vast forests. The genus *Ficus* is the most distinguishing feature of this order. Most of the plants of this order furnish caoutchouc. The fruit of the Mulberry is edible, and the leaves of the genus *Morus* are the food of the Silk-Worm. Several species of *Dorstenia* are used in medicine. Other genera of this order yielding useful products are *Broussonetia* and *Maclura.* This order embraces 8 genera and 184 species. —*Eng. Cyc.*

(5422) MOREA CHINENSIS: Thunb.

Belameanda scholarmani. Tam. Hort, Mal.

The root of this plant ground and applied to any part bitten by a Cobra is said by the people of Southern India, to prevent fatal consequences. The leaves are given by the Natives of the Malabar Coast to cattle that have eaten poisonous vegetables, to prevent their dying. See *Hortus Malabaricus*, Part 11th, page 74.—*Ains. Mat. Med. page* 130.

(5423) MOREL.—This species of Fungus is found at the latter end of the rains, and generally dug out of white ants' nests. The wholesome sorts of mushroom are readily distinguished by being of a pink or flesh color in the gills, changing to a darker color as they get older; they have also a peculiar sweet smell: and another criterion of their being edible is the outer skin pealing off easily.—*Jaffrey.*

(5424) MORINA ELEGANS. Dipsaceæ.—This species is a native of Persia, the colours red, and white, grown from seed as most other annuals.

(5425) MORINDA.

Morinda Citrifolia.

Ali ka Jhar, Hind.
Aach or Atchy, Tam.
Moagha, Tel.
Nyagyee, Burm.

Morinda Umbellata.
Noona marm, Tam.

Morinda Exserta.
Nya, Burm.

Morinda: this name is given to the bark and root of several species of Morinda, the *M. Tinctoria*; *M. Citrifolia*, *M. Umbellata*, in India, and *M. Exserta*, in Burmah, and are employed to form a very valuable red dye, which is fixed with alum; but Buchanan mentions another species the M. ternifolia in Mysore, the root of which is used for similar purposes. Most of the red turbans of Madras are dyed with the root of the Noona tree. The Karens prepare their red dyes most usually from the roots of the morinda tree, and at least two or three species are used for this purpose. The *M. citrifolia*, is cultivated by the Burmese for a dye, but the Karens more commonly use *Morinda exserta* the indigenous species.

(5426) MORINDA BARK, From Morinda tinctoria, citrifolia and umbellatta. Specimens of the bark and root of various species of Morinda were exhibited at the Madras Exhibition of 1855, from different parts of Southern India and the Northern Circars. These form a very valuable red dye which is fixed with alum: colour, though not brilliant, is far more permanent than many other red colours—the most of the Madras red Turbans are dyed with the root bark of the *Noona* tree, which is pretty common, and is in flower great part of the year. The large Triplicane burying ground is thickly studded with the tree. The quantity procurable is very large, and the dye appears worthy of the attention of practical dyers. —*M. E. J. R.*

(5427) MORINDA, Morinda Fruit. A species of morinda is often seen growing near Burman houses, which produces a fruit as large as a pullet's egg. It is a great favorite with the Burmese, and is served up in their curries.—*Mason.*

(5428) MORINDA, Fragrant Morinda. The most agreeably fragrant, flowering shrub in the Karen forests, is a species of morinda, that has not yet found its way into cultivation. The flowers are small, in dense heads, like other members of the genus, azure purple externally, but white within; and has only four anthers, like a species described by Jack which he found on the Malay Islands.—*Mason.*

(5429) MORINDA BRACTEATA.

Yaiyoe, Burm.

This wood, of bright yellow colour, is found in the Bengal bazars under the name of *Rouch*, and is valuable as affording a bright yellow dye. The tree is common throughout the province of Pegu. It is also cultivated about Phoungyee houses.—*McClelland.*

(5430) MORINDA, BRACTEATA, YAIYOE: AND M. EXSERTA.

Mhau bin. Burm.

Both are small trees, only found about Phoungyee houses, in a cultivated state: yellow-wood, fit for fancy work.—*McClelland.*

(5431) MORINDA CITRIFOLIA: Aal, ach, Morinda citrifolia. *Rubiaceæ.*

Munja pavuttay marum, Tam.
Togaree wood, Eng.
Togaru kurra, Tel.
Bura-al, Hind.

This tree is common in Kotah and Boondee. The flowers have a very sweet scent and the tree would be ornamental and thrive well in compounds.—*Genl. Med. Top. p.* 182. The wood of this tree is a deep brownish yellow and the roots are used in dyeing. The quality of the wood, judging simply from the appearance, is little if at all inferior to the preceding; but the tree is much smaller.—*Wight.* Mr. Rohde has seen trees of this wood nearly 2 feet in diameter: the roots are used to assist more expensive dyes in giving a red colour to yarn and cloth—the red thread used in carpet making is entirely dyed with it. The process of dyeing red yarns in the Circars is well described by Heyne.—*Rohde.* The roots of the awal tree of Malabar and other parts of India, *Morinda citrifolia*, and of *M. tinctoria*, found abundant in all the Asiatic islands, are extensively used as a dye stuff for giving a red color. It is usually grown as a prop and shade for the pepper vine, and coffee tree. The coloring matter resides principally in the bark of the roots, which are long and slender, and the small pieces are the best, fetching 8s. to 10s. a maund. It is exported in large quantities from Malabar to Guzerat, and the northern parts of Hindostan, but seldom finds its way to Europe.—*Simmonds.*

(5432) MORINDA MULTIFLORA: AAL, Vernacular at Nagapore. Achu Al. A native of Berar much cultivated about Nagapore for its dye.—*Rox. Rohde M.S.S.* Cultivated through Rajpootanah principally near Kotah, and all over Harowtee. The plant is allowed to remain three years in the ground, and then the roots are taken up and dried. The dye is a fine turkey red and is very plentiful. One maund costs sixteen rupees. Is not used medicinally.—*Gen. Med. Top p.* 125.

(5433) MORINDA TINCTORIA.

Uchyoota, Sans.
Al or Aach, Hind. Beng.
Tagaroo, Tel.

This small tree is pretty common in every part of India. It is in flower and fruit the greater part, if not the whole of the year. It is largely cultivated at Boondee, Kotah and Mewar. —*Genl. Med. Top. p.* 182. The bark of the roots is used to dye red, the colour is fixed with alum, but it is neither bright nor durable. In some parts of India, it is cultivated for the sake of the roots. In the Circars the dyers use the bark of the fresh roots bruised and gently boiled in water for a short time. The cloth or yarn is prepared in a cold infusion of the powdered gall of Terminalia chebula, in milk and water; it is then dried and moistened with alum water, and again dried, and receives from the above decoction, a pretty bright, but fugitive red. The green fruits are pickled by the Hindoos and eaten with their curries. The wood is hard and very durable, variegated with red and white, it is employed for gunstocks in preference to all other kinds.—*Roxb. Rohde M.S.S.* Dr. Irvine says the root is extensively exported as a red dye, the colour is fixed with alum. The plant is not allowed to shoot up into the bush, but is dug up the third year after planting. The flowers are very fragrant; of the large plant, the berry is eaten. The wood of all the species is beautiful, hard and durable; and excellent for gun stocks.—*Med. Top. p.* 182.

(5434) MORINDA UMBELLATA. Leaf of the Umbellated Morinda. Lin.

Noona marum elley Tam.
Chota Al ka paat, Duk.
Kleeba, Sans.
Mang-kudu, Malay.

There are two species of this tree common in India, both of which are called Noona Marum by the Tamools, the one however is smaller and more erect than the other, and is distinguished by the botanical appellation of Morinda Umbellata. The roots of either sort are used as a red dye.—*Ains. Mat. Med.* The wood and roots of *M. umbellata*, known in the eastern islands as "Mangkudu," are used extensively for their red dye, in Celebes and Java. Specimens of all these, and of the Lopisip bark, bunchong bulu wood, and the gaju gum (from undescribed plants), have been introduced into England. They are said to furnish excellent dyes in the Asiatic islands. Native dyes from Arracan have also been imported, viz., thit-tel and the-dan yielding red dyes, ting-nget and reros, affording dark purple dyes; and thit-nan-weng, a chocolate dye. These would be worth enquiry, and particulars of the plants yielding them, the quantities available, and the prices might be procured. *Simmonds. Noona-kai*, Tam., the fruit of this tree, when green, is used as pickles.—*Jaffrey.*

(5435) MORINGACEÆ, *Moringads*, a small natural order of Exogenous Plants, embracing the species of the genus *Moringa.* They are characterised by the possession of a many-leaved calyx, perigynous petals and stamens, 1-celled anthers, stipitate and consolidated siliquose fruit, and seeds without albumen. This order is referred by most botanists to a position near *Leguminosæ*, but Lindley places them in his *Violales.* They are natives of the East Indies and Arabia. The root of *Moringa peterygosperma* has a pungent odour with a warm biting and somewhat aromatic taste. The seeds of this plant are called by the French Pois Queinques and Chicot They are the Ben-Nuts of old writers, from which the Oil of Ben was extracted. It is chiefly used by perfumers as the basis of various scents. It does not readily freeze and on this account is used by watchmakers. The flowers, leaves, and other parts of this plant are added to curries in India. —*Eng. Cyc.*

(5436) MORINGA.

Sohunjuna, Moongay kajhar, Duk.
Sujna, Hind.
Sigroomala, and Sohanjana, Beng.
Sajna, Pers.
Moriaben, Arab.
Seeds Hubool ban, Arab.
Da-tha-lwon, Burm.
Mooringa marum, Tam.
Mooraga chettoo, Tel.

Moringa, leaves, root, flowers, seed vessels or fruit, gum, wood, bark, and oil, for all these parts and products of the Moringa pterygosperma are used by the people of India and by Europeans. The tree is very abundant all over India, Burmah and Malay peninsula. The leaves, flowers and seed vessels are used in curries. The roots have precisely the flavour of horse-radish, and seem identical in chemical composition, and in India are substituted for the true horse-radish by Europeans. The Gum and bark are used in native medicine. Royle mentions that the oil is aperient, and much used by the natives in gout and rheumatism. Ainslie mentions that the native doctors prescribe the green root as a stimulant in paralysis and in intermittents, in scruple doses, and use it also in epilepsy and hysteria. The seeds are also used internally by the native practitioners, for their pungent and stimulating virtues. In Jamaica the wood is used for dyeing a blue colour. An oil is obtained from the seeds possessed of the same qualities as the *oil* of *ben* the product of the *M. aptera*, a native of Sennaar, Cairo and Palestine, much used by perfumers and by watch makers, as it neither grows rancid nor freezes readily. The delicate perfume of flowers are often retained by the ben oil, by pouring it over the flowers, or strewing layers of the flower for about four hours over cotton soaked in the oil. In the West Indies the oil is used as a salad oil. According to Mr Faulkner ben oil is also prepared from the Guilandia Moringa, a tree which he says grows in Ceylon, Arabia, Egypt and Ethiopia.

(5437) MORINGA GUM FROM MORINGA PTERYGOSPERMA, obtained in a large quantity, does not dissolve in water, resembles in some respects Gum Tragacanth, for which it may probably be substituted.—*M. E. J. R.*

(5438) MORINGA APTERA. A native of Sennaar, Cairo, and Palestine. The seed yields the *oil* of *ben*, much used by perfumers and by watch-makers, as it neither grows rancid nor freezes readily; seeds acrid, and used as a rubefacient. They are also said to be purgative and emetic in small quantities.—*O'Shaughnessy*, *p.* 289.

(5439) MORINGA CONCANENSIS. A new species discovered in the Southern Concan. —*Riddell.*

(5440) MORINGA PTERYGOSPERMA, *Syn.* HYPERANTHERA MORINGA.

Sohunjuna, Moongay ke jar ke-jur, DUK.
Sujna, HIND.
Sigroomala and Sobhanjuna, SANS.
Sajna, BENG.
Moriaben, PERS.
Seeds, Hub-ool-ban, ARABIC.
Mooroongay-kai-keeray and poo, TAM.
Moosing, DUK.

Indian Horse Radish tree.—This tree grows readily from seed, and attains a height of from fifteen to twenty feet, in its second year; the root when young and fresh scraped, has the flavour of English Horse radish; the pods when young and green are used as a vegetable both boiled and in curries; the seed when ripe yields a fine clear oil; the wood of the tree is soft and of little use.—*Riddell.* It is commonly cultivated in India for leaves, flowers, and seed vessels, which are used in curries. The roots have precisely the flavour of horse-radish, and seem identical in chemical composition. Reduced to a pulp they afford an excellent external irritant. An oil is obtained from the seeds, possessed of the same qualities as that of the M. aptera. It is said by Royle to be aperient, and much used by the natives as an unguent in gout and rheumatism. The seeds are also used internally by the native practitioners for their pungent and stimulating virtues.—*O'Shaughnessy.* This is a very useful tree. The leaves and flowers are much eaten by the natives, and make an excellent vegetable. The pods are freely eaten by Europeans as asparagus, either boiled separately or in curries—the roots as a substitute for horse radish—the natives have recourse to this root in adulterating the country mustard, prepared here for sale, and very often pass it off for genuine English; cultivated every where, in gardens and about villages. The large branches planted in the ground root freely and soon become small trees, giving a continued supply of wholesome vegetables; produce from seedling plants is the best.—*Jaffrey.* The delicate perfumes of flowers are often retained by the ben oil, by pouring it over the flowers, or strewing layers of the flowers for about four hours over cotton soaked in the oil. It is thus that the jessamine, and several other very volatile odours are obtained by the perfumers. Ainslie mentions that the native doctors prescribe the green root as a stimulant in paralysis, and in intermittents, in scruple doses, and use it also in epilepsy and hysteria. In Jamaica the wood is used for dyeing a blue colour, (Ainslie i. 176). —*O'Shaughnessy*, *page* 289. The horse-raddish-tree is propagated by the Burmese for its pods, which are eaten in curries; but it is chiefly valued by Europeans for its roots which cannot be distinguished when eaten with roast beef, from the common horse-raddish, *Cochlearia Armoracia.*—*Mason.*

(5441) MORINGA PTERYGOSPERMA, COMPOUND INFUSION OF SOHUNJUNA. This preparation represents the compound infusion of Horse Radish of the London Pharmacopia. The root of the Moringa pterygosperma, Sohunjuna of Bengal, is a perfect substitute in flavour and properties for the European Article.—*Beng. Phar. p.* 304.

(5442) MORINGA PTERYGOSPERMA, COMPOUND SPIRIT OF SOHUNJUNA. Stimulant in a dose of from two to four fluid drachms in water.—*Beng. Phar. p.* 414.

(5443) MORINGA ROOT. SOHUNJUNA. Root of Moringa pterygosperma.—*Beng. Phar.*

(5444) MORINGA SEEDS. HUB-OOL-BAN. Moringæ semina. An excellent substitute for the horse-radish, Coehlearea armoracia.—*Ben. Phar.*

(5445) MOROCCO LEATHER, Maroquin.

Maroquin, Fr.
Satiam, Ger.
Marrocchino, It.
Safian, Rus.
Marroqui, Sp.

A fine kind of leather prepared of skins of goats in the Levant, Barbary, Spain, &c. It is of various colours, and is used for lining carriages, chairs, in the binding of books, &c.—*Faulkner.*

(5446) MORUS, a genus of Plants belonging to the natural order *Moraceæ.* The flowers are monœcious; the staminiferous flowers spiked; calyx 4-parted, spreading, membranous; the stamens 4, larger than the calyx, with the rudiments of an ovary between their bases: the pistiliferous flowers clustered; sepals 4, scale-like, imbricating each other, 2 being opposite and external to the other 2; stigmas 2, linear, glandular; ovule solitary, suspended. Fruit consisting of the latter flowers become fleshy and grown together, each inclosing a dry membranous pericarp. Seed pendulous; embryo curved like a horse-shoe, amongst fleshy albumen, with the radicle directed to the hilum. The species are trees.—*Eng. Cyc.* The genus *Morus* is numerous in species and abounding in individuals, many of which are cultivated on account of their fruit, but still more for their leaves as food for the silkworm. It is probable that most of the species of the genus Morus have bark of a sufficiently fibrous nature. But few, if any, seem to be turned to this useful account. Yet the bark of the White Mulberry seems from very early times to have been made into paper in China; for Marco Polo informs us that "the Grand Khan causes the bark to be stripped from those Mulberry trees, the leaves of which are used for feeding silkworms, and takes from it that thin rind which lies between the coarse bark and the wood of the tree. This being steeped, and afterwards pounded in a mortar until reduced to a pulp, is made into paper, resembling that which is made from cotton." This fact directs attention to the bush cultivation of the Mulberry in Bengal, for feeding silk-worms. This culture consists in planting cuttings of the Mulberry, which as they grow, are cut down about four times in the year, in order to produce young leaves for the successive broods of silk-worms. The countless number of shoots which are thus thrown away, or used as fuel, would probably, under the agency of the dhenkee, yield good half-stuff for the paper-maker. Mr. Henley, indeed, informs us that, before leaving India, he had produced very satisfactory specimens of half-stuff from the bark of these rejected stems. The bark separates when the cut stems are steeped in water, and when pounded up, the greater part of the mucilaginous matter passes off, leaving a mass, having much of the good qualities of linen rag half-stuff. —*Royle Fib. Pl. p.* 341. In China, the leaf of the common mulberry is the principal object of its culture, but the fruit is eaten, and the wood burned for lampblack used in making ink—*Williams' Middle Kingdom, p.* 281. Two species, Morus alba, the White, and Morus Nigra, Black, grow equally well in the Dekhan; the white, growing to a very large tree, shedding its leaves before the hot season. The red mulberry bears fruit in the rains, as well as the black. Silk worms may be fed on the young fresh leaves, although the leaves of the white are preferred. Grows from seed or cuttings.—*Riddell.*

(5447) MORUS ALBA, the white Mulberry is a native of China where it forms a small tree, and whence it has been gradually carried westward till it has become a common plant in most of the temperate parts of the Old World, forming in the south of Europe a pollard-tree by road-sides. Its leaves are smooth and shining, usually heart-shaped at the base, and on old trees ovate or oblong, but on young vigorous shoots as frequently divided into deep lobes. The fruit is white, insipid, and of little value except for feeding poultry; in England it is seldom formed. It is on this species that the silk-worm is chiefly fed; and in silk countries many varieties are cultivated for the purpose, some of which are said to be much better than others. The common wild kind is said to suit the silkworm as well as, or even better than, any other kind; but as it yields only a small quantity of foliage, compared with other sorts, it is principally employed as the source of seeds from which stocks are raised for grafting more productive varieties. Of the latter each silk country has its own fancy kinds, which there would be little advantage in noticing here; but there is among them an exception of importance, the value of which has been recognised wherever it has been cultivated. Some years since a mulberry was introduced into France from Manilla, whence it has gained the name of the Philippine Mulberry, the great excellence of which seems universally acknowledged. It has straight smooth branches, oval, heart-shaped leaves, tapering to a point, thin, rather soft, a little blistered and puckered in the middle, often drooping, and sometimes more than six or even nine inches broad in the dry climate of the south of France. It grows much faster than the White Mulberry, and strikes from cuttings as freely as a willow, which is not the case with the latter. The abundance of its leaves is much greater than any other known variety, and, what is most important, it is not only freely eaten by the silkworms, but perfectly agrees with them. Its culture is now superseding that of all others in the south of Europe, and it is even taken as a stock on which to graft the common white Mulberry, when the latter is wished for. According to M. Bonafous this may be done either upon layers of the Philippine Mulberry, headed down to one or two eyes above the ground, or upon cuttings seven or eight inches long, which may be planted immediately after having been grafted : the young plants will be five or six feet long the first year, and three or four inches in circumference. This mulberry is sometimes called *Morus multicaulis*. In England the White Mulberry and all its varieties suffer a good deal from the winters, but not so much as to prevent its cultivation. Some years ago an attempt was made to introduce it and the rearing of silkworms into Great Britain ; but the attempt failed, owing partly to unskilful management, but more to the soft juicy condition of the leaves in that damp climate, which rendered them unfit for the food of the worm. Loudon, *Arboretum Britannicum).—Eng. Cyc.*

(5448) MORUS ATROPURPUREA.

Shatoot, Duk.

Cultivated as the former.

This species of mulberry from China scarcely diffused throughout the Tenasserim Provinces, which produces a very agreeable black berry in great quantities and is a valuable fruit.—*Mason.*

(5449) MORUS INDICA, Mulberry. Willd.

Cumble pullum, Tam.
Toot, Duk.
Babisaru, Malay.
Toota, Sans.

A small tree with long tapering leaves sometimes lobed, fruit dark red, used for making tarts.—*Riddell.* This small Indian Mulberry which is found in Southern India, is a delightful fruit and is considered by the natives as cooling and aperient.—*Ainslie, p.* 223,

(5450) MORUS NIGRA. The black or Common Mulberry, is a small tree with very rugged bark. The young shoots are downy ; the leaves roundish, cordate, pubescent, coarsely serrated, rough to the touch, slightly acuminate ; stipules oblong, membranous, downy, the length of the petiole or longer, deciduous. The Black Mulberry is the only species of *Morus* worthy of being cultivated as a fruit-tree. It is a native of Persia, and its indigenous range appears to be extensive. Its introduction to England dates about the middle of the sixteenth century. Under great vicissitudes it proves very tenacious of life ; and under ordinary circumstances it attains, even in that climate, a considerable age, for some trees planted in 1548 are still alive. The fruit is used at the dessert, fresh gathered, and at the same time it ought to be so ripe as to be just ready to drop from the tree ; indeed the fruit may be said to be in the highest perfection with regard to ripeness when it actually drops, and hence a grass plot surrounding the trunk is desirable ; but the trees are found to thrive better when the soil is kept stirred ; however, as grass will be generally preferred, all strong-growing sorts of grasses should be avoided ; and it should also be kept very closely mowed till at least immediately before the fruit ripens. By this means the sun's rays will be permitted to penetrate the soil to a greater depth than when obstructed by a covering of long grass. Mulberries are also preserved in the form of a syrup ; and their juice, mixed with that of apples, forms a beverage of a deep port-wine colour, called Mulberry-Cider. The soil for mulberrry trees should be of a light, rich, and moderately dry nature. If the subsoil be not naturally pervious, it should be rendered as much so as is possible. A good bottoming of brick rubbish will prove beneficial with regard both to the growth of the tree and the flavour of the fruit. Propagation of the Mulberry may be effected either by seeds, cuttings, or layering. The last is the preferable mode, where it can be conveniently adopted ; and the shoots or branches used for this purpose, as also those intended for cuttings, should be selected from those trees, or parts of a tree, that have been observed to be most fruitful ; for although the plant is generally monœcious, yet some trees occasionally assume a diœcious character. Hence, likewise, seedling plants are not so desirable as those propagated from trees previously ascertained to be prolific : and moreover seedling plants are a greater number of years in attaining to a bearing state. As the acquisition of a good mulberry-tree is very desirable, the following directions for obtaining a bearing tree readily and quickly will be useful. If a tolerably large branch of a vigorous tree is ringed and the annulation is inclosed in a box filled with rich soil, sufficiently large to hold as much as will preserve a somewhat uniform temperature, or at least an approximation to that which the roots of a tree naturally experience in the ground, roots will be readily emitted into the earth, and in due time the branch may be cut off and planted. A covering of moss is useful, partly for maintaining an equable temperature, and partly for preserving moisture. The Mulberry-Tree requires very little pruning beyond that of regulating the head. The season for this operation should be always mid-winter ; for if in a growing state, this plant bears amputation very ill, especially as regards large limbs. Mulberries have been trained against south walls, over which a single plant has been known to extend upwards of ninety feet horizontally ; additional size and flavour are said to have been gained, but certainly not so much over a standard on a proper bottom as to compensate for the great extent of wall-room occupied.—*Eng. Cyc.*

(5451) MORUS PAPYRIFERA, now, BROUSSONETIA PAPYRIFERA. The Japanese make abundance of paper as well for writing and printing, as for tapestry, handkerchiefs, packing cloths for goods, &c. It is of different qualities, and some of it is as soft and flexible as our cotton cloth. Indeed, that used for handkerchiefs might be mistaken for cloth, so far as toughness and flexibility are concerned. The materials, of which it is made is the bark of the mulberry, (morus papyrifera,) and the process is described as follows: In December; after the tree has shed its leaves; they cut off the branches about three feet in length and tie them up in bundles. They are then boiled in a ley of ashes in a covered kettle, till the bark is so shrunk that half an inch of the wood may be seen projecting at either end of the branch. When they have become cool, the bark is stripped off and soaked in water three or four hours until it becomes soft when the fine black skin is scraped off with a knife. The coarse bark is then separated from the fine; the new branches make the finest paper. The bark is then boiled again in fresh ley, continually stirred with a stick, and fresh water from time to time is added. It is then put in a sieve and taken to a brook, aud here the bark is incessantly stirred until it becomes a fine pulp. It is then thrown into water and separates in the form of meal. This is put into a small vessel with a decoction of rice and a species of Hibiscus, and stirred until it has attained a tolerable consistence. It is then poured into a large vessel, from whence it is taken out and put in the form of sheets on mats or layers of grass straw, these sheets are laid one upon another with straw between, and pressed to force the water out. After this they are spread upon boards in the sun, dried, cut, and gathered into bundles for sale. This paper will better endure folding, and last longer than that of Europe.—*American Expedition to Japan page* 64.

(5452) MOSCHIDÆ, a family of Ruminant Quadrupeds familiarly known as Musk-Deer. Linnæus defines the genus *Moschus*, which he places between *Camelus* and *Cervus*, under his order *Pecora*, as having no horns, and the upper canine teeth solitary and exserted—"Cornua nulla Dentes Laniarii Superiores solitarii, exserti." Dr. J. E. Gray, in his 'Disposition of the Mammalia' ('Annals of Phil,' 1825), divides the family *Bovidæ* into two sections, the first with persistent horns, and the second with either no horns or deciduous horns. He makes *Moschina* the fourth sub-family, and arranges it between *Camelina* and *Cervina*, in the second section. The genera of *Moschina*, in this arrangement, are *Moschus* and *Memina*. The same author, in June, 1836, read to the Zoological Society of London some observations 'On the genus *Moschus* of Linnæus, with descriptions of two new species.' He remarked that the only character by which this genus, as established by Linnæus and others, differs from the genus *Cervus*, consists in the absence of horns; for the elongated canines are common to it and most of the Indian species of *Cervus*, especially the *C. Muntjac*. The character of the fur, the degree of hairiness or nakedness of the metatarsus and the presence or absence of the musk-bag of the male, offer however, he observed, good characters for the sub-division of the group into three very distinct sections or sub genera. The first of these divisions, for which Dr. Gray would retain the name of *Moschus*, comprehends only the Tibet Musk, *M. Moschiferus*, Linn. In common with the Deer and Antelopes, it has, he pointed out, the hinder and outer side of the metatarsus covered with close erect hair, and, like many of the deer also, its fur is quill-like and brittle; the throat moreover is entirely clothed with hair, and the males are provided on the middle of the abdomen with a large pouch secreting musk. Its young, like those of most of the Deer, are spotted, whilst the adult animal is plain-coloured. Dr. Gray further stated that the division to which, in the year 1821, in a paper in the 'Medical Repository,' he gave the name of *Memina*, also consists of but a single species, the *Moschus Memina*, Linn. In this group the hinder edge of the metatarsus is, he observed, covered with hair; and there is no musk-bag in either sex. The false hoofs, he remarked, are distinct, although Linnæus and Buffon denied their presence. The third and last sub-division is characterised by Dr. Gray, under the name of *Tragulus*, as having the hinder edge of the metatarsus nearly bald and slightly callous, a character which distinguishes them at once from all other Ruminants; the fur is soft, and adpressed like that of *Memina*, but not spotted even when young: the throat is provided with a somewhat naked, concave, sub-glandular, callous disc, placed between the rami of the lower jaw, from which a band extends to the fore part of the chin; and they have no musk-bag. Like all the other species of the Linnæan genus *Moschus*, they have false hoofs; and most of them have the edges of the lower jaw, three diverging bands on the chest, and the under surface of the body, more or less purely white. The species of this division scarcely differ in colour in the various stages of their growth, the young fawn resembling the adult in every particular except in size. In this division, the synonymy of which is stated to be extremely confused, Dr. Gray reckons four species, two of which he describes as new. Dr. Gray stated that he was unable to identify with any of the four species mentioned by him on this occasion, or to separate from them as distinct, the Palendoc, figured in Marsden's 'Sumatra,' or Pygmy Musk of Sumatra, figured in Mr. Griffith's edition of Cuvier's 'Animal Kingdom,' on which Fischer has established his *Moschus Griffithii*. The *M. pymæus* of Linnæus, in Dr. Gray's opinion, belongs to the genus *Antelope*; the hinder part of the tarsus being covered with hair, and the false hoofs very small and rudimentary, and entirely hidden under the hair of the feet. He thinks that the *M. Americanus* appears by its spotted livery to belong to a species of Deer; and that the *M. delicatulus*, or Leverian Musk of Shaw, is undoubtedly the fawn of a deer. Dr. Gray further observed that it is curious that Dr. Shaw quotes as a synonym of the last-named species the figure of Seba, on which alone the *M. Americanus* is founded, while at the same time he enumerates the *M. Americanus* as a distinct species ('Zool. Proc.,' 1836.) In the same year Mr. Ogilby, in his paper on the 'Ruminantia,' read before the Zoological Society, makes the *Moschidæ* the third family of that order, with the following character:—Feet bisulcate; horns; incisor teeth (primores), above none, beneath eight. Two genera,

1. *Moschus.*—Rhinaria large. Lachrymal sinuses none; interdigital fossæ none; inguinal follicles none: teats four. Type *M. Moschiferus.*

2. *Ixalus* (?).—Rhinaria none. Lachrymal sinuses small and distinct; interdigital fossæ none; inguinal follicles small; teats two. Type, *I. Probaton.* ('Zool. Proc.,' part iv. p. 119.) Mr. Ogilby goes on to state that the genus *Ixalus*, founded upon the observation of a single specimen, may eventually prove to belong to a different family: and indeed he observes that it differs little from the true antelopes; but even supposing it to be correctly placed among the *Moschidæ*, other forms, Mr. Ogilby remarks, are still wanting to fill up the chasms which evidently exist among the character of that group. "Two," continues Mr. Ogilby, "are more especially indicated, and our knowledge of the laws of organic combination, and of the constituent parts of other groups, gives us every reason to believe in their actual existence, and to anticipate their discovery." He then proceeds to characterise the genera *Hinnulus* and *Capreolus*, observing that they will probably be found, one in the tropical forests of the Indian Archipelago, and the other on the elevated table-lands of Mexico or South America. "It may appear a bold, perhaps a presumptuous undertaking," says Mr. Ogilby, "thus to predict the discovery of species and define the characters of genera, of whose actual existence we have no positive knowledge; but, as already remarked, all the analogies of nature, whether derived from organic combination, or from the constituent members of similar groups, are in favour of the supposition; and I may observe further, that the recent discovery of the genus *Ixalus*, if indeed it eventually prove to be a genus, of which I had long previously defined the characters, as I have here done for the presumed genera *Hinnulus* and *Capreolus*, strengthens my belief in the actual existence of these forms, and increases the probability of their future discovery." The family is placed by Mr. Ogilby between the *Cervidæ* and *Capridæ*. The same author makes *Tragulus* (type *Antilope pygmæa*) the first genus of his family *Bovidæ*. The *Moschidæ* do not differ much from the other Ruminants; the leading differences are given above, and the general osseous structure of the form may be collected from the following.

Dental Formula:—Incisors $\frac{0}{8}$; Canines $\frac{1-1}{0-0}$; Molars $\frac{6-6}{6-6}$ = 34.

The canine teeth go far back into the upper jaw. It is not impossible that the so called canine teeth of *Ursus cultridens* may be the canine teeth of an extinct ruminant allied to this family, or that of the *Cervidæ*.

Moschus Moschiferus, the Musk, or Tibet Musk. It has somewhat of the form of a Roebuck; but higher behind than it is at the shoulder, from the upper part of which to the sole of the foot it measures about 2 feet 3 inches; whilst from the top of the haunches to the soles of the hind feet the measurement is about 2 feet 9 inches. Ears long and rather narrow, in the inside pale-yellow and dark-brown outside. Hair on the body suberect, long, each hair marked with short waves from top to bottom, ash-coloured near the base, black or blackish near the end, and rusty at the tips. Chin yellow. The colours vary. Most of the adults are plain-coloured. In some, and such is the individual figured by Pennant, the fore part of the neck is marked on each side with long white stripes from the head to the chest, the back striped transversely with pale-brown reaching to the sides, which are also dappled with a lighter colour. Hoofs very long and deeply divided, spurious hoofs very long. Tail about an inch long, concealed in the hair. Scrotum rutilum. Penis vix percipiendus. (Pennant.) Female less than the male, and wants the two tusks. Young, spotted. The Musk is a mountain animal, timid, and shy, and lover of solitude. Precipices covered with pines and almost inaccessible crags are its favourite haunts; and the musk-hunter often perils his life in the dangerous chase; for when hotly pursued the animal takes refuge frequently in the highest fastnesses, leaving men and dogs with scarcely the possibility of access to the precipitous summits to which it flies. And yet the slaughter made among them must at one time have been great, and the animals abundant; for Tavernier bought in one journey 7673 musk-bags. The bag, or tumor, containing this well-known drug is peculiar to the male: it is kidney-shaped, pendulous, of the size of a hen's egg, and situated beneath the abdomen. There are said to be two apertures, the larger oblong, the smaller round, and covered with hair: and on the application of pressure the musk may be forced through the apertures. It is brown and unctuous. This bag the hunters cut off, and tie it up for sale, but, like everything that is calculated for the use of man and is the object of commerce, it is said to be adulterated by the admixture of foreign matter, and pieces of lead are stated to have been found enveloped in it, for the purposes of increasing the weight. The musk which comes from Tibet is considered the best, and used to bear the highest price; the bag is more or less full, and the quality more or less good, according to the age and health of the animal. When dry, musk is dark-brown, inclining to red, or rusty-black, and appears more or less granulated. To the taste it is rather bitter and somewhat acrid. It is perhaps the strongest and most pungent of perfumes, and so subtle that every thing near it becomes infected, and for a long time retains the odour; vessels of silver even, a metal which, as much as, if not more than others, readily becomes purified from odorous substances, do not part with the scent of musk, which may have been placed in them, for a long time. When fresh, or exposed in large quantities, its effects upon the nervous system are said to be absolutely violent; and it is stated that blood has been forced from the nose, eyes, and ears, of those who have imprudently inhaled the vapour of a considerable quantity. When Chardin made his purchases, he secured himself from the sudden effects of the smell by covering his face with a handkerchief several times folded. The mere skin of the animal fills the place where it is kept with the perfume for a long period. In medicine it is used for nervous and convulsive cases in considerable doses. The flesh of the animals, though that of the males is rather highly flavoured with musk, is eaten by the Russians and Tartars. In rutting-time this flavour is most predominant. It is a native of Tibet; the province of Mohang Meng in China; Tonquin, and Hootan; about the lake Baikal; and near the rivers Yenesei and Argun. Found from lat. 60° to 44° or 45°; but never wanders so far south, except when forced through hunger, by great falls of snow, when it migrates to feed on corn and new grown rice. (Pennant.) The description given by Linnæus of this species is an example of his great neatness. He describes the Tibet Musk as *Moschus folliculo-umbilicali*; and this is the distinction of the species, as far as we yet know. It does not appear to have been known to the ancients, but seems to have been first mentioned by the Arabians. Serapion described it in the 8th century. There are three other species of *Moschus*—*M. Sibiricus*, the Kubaya, a native of Siberia; *M. leucogaster*, the White-Bellied Musk, a native of Nepaul; *M. chrysogaster*, the Golden-Eyed Musk, also from Nepaul. The *Moschus aquaticus*, Ogilby, the Boomorah of West Africa, is the *Hyemoschus aquaticus* of Gray.

Meminna Indica (*Moschus. Meminna*, Linn.) It is the only species known. Length about 17 inches. Ashy-olive; throat, breast, and belly white, sides and haunches spotted and barred transversely with white: ears large and open, tail very short. Weight about 5½ lbs. It is a native of Ceylon and Java. (Pennant.) Colonel Sykes informs us that it is the Peesoreh of the Mahrattas, and that it is found in considerable numbers in the dense woods of the Western Ghauts, but never on the plains. ('Zool. Proc.,' 1831.) Pennant described it from a drawing communicated by Governor Loten, of Ceylon.

Tragulus Javanicus, Pallas (*Moschus Javanicus*, Gmelin and Raffles; *M. Napu*, F. Cuvier), is the size of a large hare. Body heavy. Limbs very delicate. Head arched and long. Eyes large but not expressive. General colour brown mixed with blackish-gray or yellow reflections; yellow predominating along the back and tail, on the legs, the neck, and head; the gray and black prevail on the lower part of the shoulders, on the sides, and thighs. These different tints are the result of the colouring of the hairs, which on those parts which are yellow are of that colour for the greatest part of their length and black at the point, and where the hairs lie very thick and one on the other, some of the parts appear black. Lower jaw white; two white lines which spring from it extend thence beyond the cheeks; two other white bands spring from the same point as the first, and terminate at the shoulders; a middle band descends on the breast, widening in its descent, and is lost in the white of that part. The upper edge of the first two white bands is bordered with black, and the other bands are all separated from each other by hairs of a brownish-black colour. Belly, anterior and upper part of the hind legs, posterior and upper part of the fore legs, and the under part of the tail, white. End of the muzzle naked. Eyes surrounded with a naked part, from which springs a band without hairs which goes to the muzzle. These naked parts are black with a slight tint inclining to violet. The toes are united, by a rather loose membrane, nearly to the origin of the hoofs, which are very long and pointed; the spurious hoofs are also long, cylindrical, and pointed. Length about 24 inches. Height to the shoulder rather more than 9 inches, to the top of the haunches rather more than a foot. Mr. Bennett observes that M. F. Cuvier regards five radiating bands as the distinctive character of the Napu, and three as that of the Kanchil; whereas, in truth, the number is the same in both, and the difference is only in their disposition. The Napu comes from Java and Sumatra. Sir Stamford Raffles states that this species frequents thickets near the sea-shore and feeds principally upon the berries of a species of *Ardisia*. He adds that it can be easily trained, when taken young, and will become quite familiar. Dr. Gray refers also to this genus *Moschus Kanchil* (Javan Musk of Shaw, Le Chevrotain de Java of Buffon); *M. fulviventer* (Le jeune Chevratain of Buffon); and *M. Stanleyanus*, of which last, in 1836, there were four living specimens in the magnificent collection of the Earl of Derby at Knowsley; and two others consisting of a specimen of each of the varieties, in that of the Zoological Society of London, the gift of her present Majesty. With the exception of the last, whose locality is not known, these are Oriental, the Kanchil being an inhabitant of Java, and the *Tragulus fulviventer* a native of the Malacca Islands and the East Indian Peninsula, but the habitat of *T. fulviventer* is given by Dr. Gray with a query.

(5453) MOSQUITO, a term applied to certain stinging Flies belonging in all probability to several distinct genera. The mosquitoes are either gnats or gnat-like insects, which are furnished with a proboscis adapted for piercing the flesh, and at the same time forming a kind of siphon through which the blood flows; this instrument moreover injects into the wound which it makes a poison which causes inflammation. Many insects called Mosquitoes probably belong to the same tribe as the Common Gnat (*Culex*, Linn.); Humboldt however asserts that the insects known by that name in America belong to the genus *Simulium*, and that the *Culices*, which are equally numerous and annoying, are called Zancudoes, which means long legs. The former are what the French call Moustiques, and the latter Cousins.—*Eng. Cyc.*

On the Metamorphoses of the Musquito.—*By* W. GILCHRIST Esq., *of the Madras Medical Establishment.*—The Musquito has three stages of existence, in two of which it is a water insect, in the third the well known winged one—6th May, 6 A. M. I observed several Musquitos on the surface of some stagnant water, each in close proximity to a yellowish substance, which, when viewed through a microscope, proved to be a collection of eggs that the musquitos were depositing; each collection, though consisting of not fewer than one hundred eggs, did not exceed three twentieths of an inch in length, and about one twentieth of an inch in breadth. These eggs were arranged in lines, standing on end, and were each about 1-40th of an inch long; the lower end being larger than the upper, so that the upper surface of the collection was somewhat concave. A few of these collections of ova were carefully introduced, with some of the water on which they floated, into a tumbler, and placed under a glass shade. Excepting a change of colour, from a yellow to a dark brownish grey, which occurred within six hours after being put into the tumbler, no visible alteration took place, till two days and a half, when the water was found to swarm with animalculæ. The shells of the ova were still adherent, as when first observed. On examining one minutely, the larger, or under, end was found to have opened, like a lid, to allow the insect to escape into the water. A lady's thimble, furnished with a lid, would resemble exactly the appearance of what is being described. The design of having the lids placed at the bottom, is, evidently, to allow the newly hatched animalculæ immediate exit from the shell into the water; and the concavity of the whole collection, above alluded to, effectually tends to retain the large ends undermost. Had the ova been arranged promiscuously, as to the large and small ends being upwards and downwards, it is evident that the newly hatched insect, under the former arrangement, would have some difficulty in reaching the water, a difficulty that, most probably, would amount to an impossibility; one which, at all events, is effectually prevented by the concave form of the collection. A sketch of the newly hatched insect, about 2,500 times the natural size, was given in figure 1. In the chest, or thorax (*a*), the heart is seen (obscurely however, the body being only semi-transparent), furnished with four projections; from this organ two blood-vessels proceed down the centre of the body, to the end of the elongation (*b*), the extreme termination of which is to be seen just above the surface of the water, where the insect lives, for the most part; the body being suspended, as it were, from this, head lowermost. Between the heart, in the thorax, and the extremity of this singular elongation, an active sanguiferous circulation is to be observed; in all probability, therefore, it is the seat of the lungs or gills, and it would appear, that a comparatively large supply of air, is essential to the existence of the insect, as it lives, as much as possible, in this pendulous position at the surface, with the extremity of the elongation rising just above. Its motion, which is quick, is effected by a rapid bending of its whole body, so that head and tail (the latter represented at (*c*), and consisting of a bundle of delicate filaments, approximate, alternately, on either side of the body; it always goes tail foremost, so that the head is dragged along behind. When in search of food, it throws out, in advance of its mouth, a couple of delicate brushes, the individual filaments of which, though seen magnified to the extent above stated, were still of microscopic size. The oval shaped figures in the head (*d*. fig. 1.) represents these brushes when not in use (though obscurely, as the semi transparent body intervenes). Each of these is put in rapid circular motion, whereby a double kind of whirlpool is occasioned; whatever food comes within the sphere of these vortices, is speedily devoured. The food appears to be, principally, decomposing vegetable matter, some of which I put into the tumbler, as the vessel in which the ova were discovered contained it; on this they fed voraciously. They did not, however, entirely confine themselves to a vegetable diet. I was much amused with one, when in a drop of water under the microscope; in these confined limits its appetite did not forsake it, and the only article of food it found, was the head of one of its own species. So soon as this came within the vortex, it was ravenously seized, but, being apparently, too large a *morceau*, it was let go, after sundry futile attempts at swallowing. It frequently came within the whirlpool again, and was as often seized, but with no better success. They, however, eat the shells they had recently quitted. Some that were kept in clean water, without food, died on the third day. In this stage of their existence, the insects were lively and grew apace. At the termination of 21 days, during which the water was thrice changed, they had attained three or four twentieths of an inch in length. On attaining this size, or age, they underwent a second metamorphosis. The shape they assumed is represented in figure 2, magnified, like the former, 2,500 times. Most likely they cast their former envelope, for the hairs, so conspicuous on the former insect, were not to be seen on the present. The shape, it will be remarked, has materially altered, but the most remarkable change is that which occurs with respect to the seat of the lungs, or gills. These organs are now situate in the thorax, their former seat (the elongation b. fig. 1) has disappeared, and the channel of communication, now, between them and the air, are two small tubes (b. fig. 2) on the top of the chest. In this stage of their existence, the insects are much less active than during the former one. A still greater contrast, however, is that, now, they do not require food, and have no mouth; in this respect resembling the charysalis stage of the butterfly tribe. But the demand for air appears increased; they rarely leave the surface of the water, and, when they do descend, they take down a supply of air, small globules of which are distinctly to be observed, at the end of the tube (b. fig. 2). Their descent is accomplished by striking the water with their body, but, being specifically lighter than that fluid, they rise without any effort to the surface, though, in case of *despatch*, can impel themselves upwards by the same means as they descended. However, as has been remarked, they seldom leave the surface, and, having done so, speedily return to it. The insects remain about 48 hours in this stage; towards the termination of which the legs and proboscis of the winged musquito can be distinctly seen through the thin membrane that surrounds it. This, in due course, bursts, when the winged musquito draws itself out, stands on the surface of the water a few minutes, to dry and expand its wings, on which it presently proceeds to a dry situation. I observed several undergoing this change. If the musquito, when in either of the first two stages, be taken out of the water, it speedily dies, and it is as speedily deprived of life, if immersed in that fluid immediately after becoming the winged insect. We learn, from the above, that the musquito is a most prolific insect and that, as stagnant water such as that of tanks, &c. is necessary to its propagation, all such ought to be kept as distant as possible from our dwellings; thereby we are more likely to enjoy an immunity from their annoyance, than by practising the mode so facetiously described, or rather suggested, by Captain Basil Hall in his voyages.—*Gilchrist M. L. S. J. July* 1836.

(5454) MOTACILLINÆ, or MOTACILLIDÆ, a sub-family of Birds belonging to the family *Sylviadæ*. [SYLVIADÆ.] They are an active graceful race, tripping it along the smooth shaven grassplots, edges of ponds, and sandy river-shores in unwearied search for their insect-food, and with tails which never cease to vibrate as long as their restless bodies are in action. The species are natives of the old World only—Europe, Asia, and Africa. At least the form does not appear to have been hitherto detected in America, and that continent has now been much searched by zoologists.—*Eng. Cyc.*

(5455) MOTHER OF PEARL SHELL, OYSTER SHELL.

Cheep, GUZ. HIND. & PERS.

Is extensively used for inlaid work, toys, snuff-boxes, buttons, &c. Mother of pearl Shells are imported in Bombay from the Persain Gulf, and are re-exported to England and France.—*Faulkner.* Mother-o-pearl shells are brought to the Chinese market from the islands of the Pacific and Sulu sea, in the same vessels which bring bicho-de-mar; it also comes from California. It is a small trade, and not likely to increase much. A large proportion of that which is brought to China is re-exported in the shape of fans, paper-knives, card-cases, fish counter, and a great variety of fancy articles, the structure of the nacre of the shell rendering it easy to carve and emboss. Large shells are the best, and these should be chosen of which the nacre or inner surface is not decayed or fractured.—*Morrison.*

(5456) MOTHER-OF-PEARL, or NACRE, is the hard, silvery, internal layer of several kinds of shells, especially oysters, the large varieties of which in the Indian seas secrete this coat of sufficient thickness to render the shell an object of manufacture. The genus of shell-fish, *Pentadinæ*, furnishes the finest pearls as well as mother-of-pearl: it is found round the coasts of Ceylon, near Ormus in the Persian Gulf, at Cape Comorin, and in some of the Australian seas. The dealers in pearl-shells consider the Chinese from Manilla to be the best: they are fine, large, and very brilliant, with yellow edges. Fine large shells of a dead white are supplied by Singapore. Common varieties come from Bombay and Valparaiso, from the latter place with jet black edges. South Sea pearl-shells are common, with white edges. The beautiful dark green pearl-shells called *ear-shells* or *sea-ears* are more concave than the others, and have small holes round the margin; they are the coverings of the *Haliotis*, which occurs in the Californian, South African, and East Indian Seas. In the Indian collection of the Great Exhibition, specimens of the finest pearl-shells were shown, such as the *Meleagrina margaritifera*, *Haliotis gigas*, *Haliotis iris*, and a large species of *Turbo*, which shells are known in commerce as *flat-shells*, *ear shells*, *green snail-shells*, *buffalo-shells*, *Bombay shells*. Messrs. Fauntleroy and Mr. Banks had also some fine collections. The latter gentleman states that the shores of the Sooloo Islands afford the finest shells. The beautiful tints of mother-of-pearl depend upon its structure; the surface being covered with a multitude of minute grooves, which decompose the reflected light. Sir David Brewster, who was the first to explain these chromatic effects, discovered, on examining the surface of mother-of-pearl with a microscope, "a grooved structure, like the delicate texture of the skin at the top of an infant's finger, or like the section of the annual growths of wood as seen upon a dressed plank of fir. These may sometimes be seen by the naked eye; but they are often so minute that 3,000 of them are contained in an inch." It is remarkable that these iridescent hues can be communicated to other surface as a seal imparts its impress to wax. The colours may be best seen by taking an impression of the mother-of-pearl in black wax; but "a solution of gum arabic or of isinglass, when allowed to indurate upon a surface of mother-of pearl, takes a most perfect impression from it, and exhibits all the communicable colours in the finest manner, when seen either by reflection or transmission. By placing the isinglass between two finely-polished surfaces of good specimens of mother of-pearl, we obtain a film of artificial mother-of-pearl, which, when seen by single lights, such as that of a candle, or by an aperture in the window, will shine with the brightest hues." [Brewster's Optics, Chapter XIV., one of the volumes of the Cabinet Cyclopœdia.] It is in consequence of this lamellar structure that pearl-shells admit of being split into laminæ for the handles of knives, for counters, and for inlaying. Splitting, however, is liable to spoil the shell, and is therefore avoided as much as possible. The different parts of the shell are selected as nearly as possible to suit the required purposes, and the excess of thickness is got rid of at the grindstone. In preparing the rough pearl-shell, the square and angular pieces are cut out with the ordinary brass-back saw, and the circular pieces, such as those for buttons, with the annular or crown-saw, fixed upon a lathe-mandrel. The pieces are next ground flat upon a wet grindstone, the edge of which is turned with a number of grooves, the ridges of which are less liable to be clogged than the entire surface, and hence grind more quickly. If the stone be wetted with soap and water it is less liable to be clogged. The pieces are finished on the flat side of the stone, and are then ready for inlaying, engraving, polishing, &c. Cylindrical pieces are cut out of the thick part of the shell, near the hinge, and are rounded on the grindstone preparatory to being turned in the lathe. The finishing and polishing are described in the third volume of Mr. Holtzapffel's excellent work on Mechanical Manipulation." Counters, silk-winders &c., are smoothed with Trent sand or pumice-stone and water on a buff-wheel or hand-polisher, and are finished with rotten stone moistened with sulphuric acid, which develops finely the striated structure of the shell. For inlaid works the surface is made flat by filing and scraping; then pumice-stone is used, and after this putty-powder, both on buff-sticks with water; and the fine polish is given with rotten stone and sulphuric acid, unless tortoise-shell or some other substance liable to be injuriously affected by the acid be present in the inlay. In turned works fine emery-paper, rotten-stone and acid or oil are used. The pearl handles for razors are slightly riveted together in pairs, then *scraped*, *sand buffed* on the wheel with Trent sand and water; thirdly, *gloss-buffed* on the wheel with rotten stone and oil, or sometimes with dry chalk rubbed on the same wheel; and fourthly, they are *handed up*, or polished with dry rotten-stone and the naked hand.—*Tomlinson.*

(5457) MOTHER-WATER, the liquor left after a saline solution has been evaporated so as to deposit crystals on cooling.—*Faulkner.*

(5458) MOTHRUS. Gums and Gum Resins.
Let-pan, Bur.

Bombax pentandra, and *Bombax heterophylla*, are two common trees found in every part of the Pegu Forests which yield an astringent gum resin, called in the bazars of Bengal *Mothrus*. I have not been able to learn whether the Burmese extract this gum, but from the abundance of trees affording it, it might become an article of some importance.—*McClelland.*

(5459) MOTHS. At Lemu Samdong in the Lachen valley *Noctuæ* and *Geometræ* abounded, with many flies and Tipulæ. *Hymenoptera* were scarce, except a yellow *Ophion*, which lays its eggs in the caterpillars above-mentioned.—*Hooker, Vol. II. p. 65.*

(5460) MOW CHOK. Bambusa, species. The most beautiful bamboo in the world—was growing about in wild profusion. This bamboo I have never met in any other part of the world. In the central and eastern provinces of China it is largely cultivated, particularly on the sides of mountains where the soil is rich, and in the vicinity of temples and other monastic buildings. Its stems are straight, smooth, and clean, the joints are small, it grows to the height of from sixty to eighty feet. Twenty or thirty feet of the lower part of its stem are generally free from branches. These are produced on the upper portion of the tree, and then they are so light and feathery that they do not affect the cleanness of the main stem. In addition, therefore, to the highly picturesque effect it produces upon the landscape, it is of great value in the arts, owing to the smoothness and fineness of its structure. It is used in the making of sieves for the manipulation of tea, rolling tables for the same purpose, baskets of all kinds, ornamental inland works, and for hundreds of other purposes, for which the bamboo found in India is wholly unsuitable. Like all other species of the same tribe, it grows with great rapidity and perfects its growth in a few months. To use a common expression, "one could almost see it growing." I was in the habit of measuring the daily growth in the Chinese woods, and found that a healthy plant generally grows about two feet or two feet and a half in the twenty-four hours, and the greatest rate of growth was during the night. The young shoots just as they peep out of the ground are highly esteemed as food, and are taken to the markets in large quantities. I was in the habit of using them as a vegetable every day during the season, and latterly was as fond of them as the Chinese are themselves. Sometimes I had them split up, boiled, and dished by themselves, at other times they were used in soup, like cabbage; and in one occasion Mr. Forbes the American Consul in China, to whom I recommended them, taught me to make an excellent omelette, in which they form one of the ingredients. In the South of China, that is about Hong-Kong and Canton, several kinds of the bamboo are very common. There is a yellow variety with beautiful green stripes, painted on its stems as if done by the hand of a most delicate artist. But all these kinds resemble the Indian varieties,—that is, they grow in dense bushes, their stems are not remarkable for their straightness, and the large joints and branches which are produced on all parts of the stem, give it a rough surface, and consequently render it unsuitable for fine work. These tropical, jungly-looking bamboos disappear as we go to the more northern latitudes and in their places we have the mow-chok, already mentioned, the long-sin-chok, the hoo-chok and one or two others, all with clean stems and feather-branches, suited for the most delicate kinds of work, and all "good for food." These trees are well worth the attention of people who inhabit temperate climates, such as the south of France Italy, and other parts of the south of Europe. No doubt they would be well worth introduction to some parts of Australia, New Zealand, and the southern portions of the United States of America. In the province of Chekiang the maximum summer heat is from 90° to 100° in the shade, but only a few days in the months of July and August so high; in winter the thermometer (Fahr.) is rarely so low as 20. Those interested in this matter may consult my 'Wanderings in China,' and 'Journey to the Tea Countries,' for fuller accounts of the climate of this part of the China. With regard to soil and situation, it should be remarked that these trees invariably grow in a rich yellow loam on the slopes of the hills. I have succeded in introducing the mow-chok to India, and at no very distant day it may be seen flourishing on the slopes of the Himalaya in the north-western provinces, where the bamboos are very inferior. Several plants were also sent to the Agricultural and Horticultural Society of India, and reached Calcutta in good condition.—*Fortunes' Residence in China, page* 189.

(5461) MOWTAN or TREE PŒONY, is abundant in China, fruits large and variegated flowers, it bears the name of hwa-wang, or king of flowers to indicate the estimation in which it is held. The skill of the native gardeners has made many varieties, but the difficulty of perpetuating them may be one reason for their high price.—*Williams' Middle Kingdom*, *p.* 285. Tree pæonies are not natives of the South of China, but are brought down in large quantities every year, about the month of January, from the northern provinces. They flower soon after they arrive, and are rapidly bought up by the Chinese to ornament their houses, after which they are thrown away, as they do not thrive well so far south as Canton or Macao, and will not flower a second season. They are sold according to the number of flower-buds they may have upon them and many of them fetching rather high prices.--*Fortunes' Wandering*, *p.*154. A flower painter in Chusan had informed me that several very valuable varieties of the Moutan, or tree Pœony, were to be found in Gardens near Shanghae. Those varieties of this flower, which are yearly brought from the northern provinces to Canton, and which are now common in Europe, have blossoms, which are either rose-colored or white: but it was always asserted, although not believed, that in some part of China purple, blue, and yellow varieties were produced, although these were never brought to Canton for sale. It was for these that I made the most particular inquiries, and this painter not only affirmed he had seen them, but also offered, for a small sum, to make me drawings from memory of all the different kinds. I employed him at once, and when he had finished the drawings, I took them with me to Shanghae. A nursery-man, who had a flower-shop in the town, to whom I showed these drawings, promised at once to procure living plants for me, but said they would be very expensive, as he would have to send to Soo-chow, a distance of nearly one hundred miles, for they were not to be procured in the vicinity of Shanghae and a man would be absent at least eight days. I was, of course, glad to get them upon any terms, and gave the man the price he asked which, after all, was not much out of the way, if they were to be brought a hundred miles. At the specified time the Moutans arrived and proved most valuable kinds, which, in England would have brought a very high sum. Amongst them there were lilacs and purples; some nearly black; and one which the Chinese called, "the yellow" which, however, was only white with a slight tinge of yellow near the centre of the petals.—*Fortunes' Wanderings, page* 135.

(5462) MOWA OIL.—BASSIÆ OLEUM.—Oil of Bassia latifolia.

(5463) MOZAIC GOLD. BRONZE POWDER. A bisulphuret of tin, formed by heating the peroxide with its weight in sulphur. It is produced in small, soft, shining flakes, of a golden yellow colour. It is chiefly imported into England from Germany, and is much used for ornamental work, particularly paper hangings.—*Waterston. Faulkner.*

(5464) MUCIC ACID, See GUM.

(5465) MUCILAGINOUS SEEDS &c. OF INDIA.

Linseed, (Ulsec,) Linum Usitatissimum,
Quince, (Beh Dana,) Cydonia vulgaris,
Tookhm,(Bulungo,) D. racocephalum Royleanum.
Isufghol, Isufghola, Plantago, Dr. Taylor.

(5466) MUCUNA, a genus of Plants belonging to the natural order *Leguminosæ.* The calyx is campanulate bilabiate with two very caducous bracteoles as long as the tube; the upper lip broad, entire, and obtuse; the lower lip trifid, with acute segments. The corolla is papilionaceous, with a cordate vexillum incumbent on the wings, much shorter than the wings and the keel, and without callosites. The stamens are diadelphous, with five of the anthers oblong, linear, and the other five ovate and hairy. The seeds oval, roundish, or reniform, with a narrow, oblong, or linear hilum. The species are climbing herbs or shrubs, with pinnately-trifoliate leaves and axillary racemes, which hang down when bearing fruit.—*Eng. Cyc.*

(5467) MUCUNA PRURIENS. *Syn.* DOLICHOS PRURIENS. Lin.

Poonaykali. TAM.
Kanchkoori ke beenge, DUK.
Peelia dooghookaia TEL.
Kiwach, HIND.
Nai Carana, (Hort Mal),
Cowitch.
Copikachu, Atmagupta SANS.

This when cleared of the small hairs which cover it is eaten by the Natives like other beans. Rheede says that on the Malabar coast it is supposed to have the effect of exciting venery.—*O'Shaughnessy, Ainslie, p.* 244. *M. pruriens*, Common or Stinging Cowitch, has entire ovate-acute leaflets, smooth above, hairy beneath, the lateral ones oblique at the base, the middle one slightly rhomboidal. The racemes are from 12 to 18 inches long, lax, and many-flowered. The calyx is hairy, pink, with narrow lanceolate segments. The flowers have a disagreeable alliaceous smell; the vexillum is flesh-coloured, the wings purple or violet, and the keel greenish-white. The legumes about 3 inches long, the thickness of the finger, closely covered with strong brown stinging hairs. The seeds oblong, variegated with a white hilum. A mixture of the hairs of this and the next species form the Cowitch of commerce. The ripe pods are dipped in syrup, which is scraped off with a knife, and when the syrup has attained the thickness of honey, by means of the hairs becoming mixed with it, it is used as a medicine, and is considered a good anthelmintic, as it occasions no uneasiness. It is given from a tea-spoonful to a table-spoonful in the morning, fasting. The hairs, when applied to the skin, produce an intolerable and painful itching. A vinous infusion of the pods, 12 to a quart, is said to be a certain remedy for dropsy. A strong infusion of the roots, sweetened with honey, is used by the native practitioners in India in cases of cholera. It is likewise considered a powerful diuretic.—*Eng. Cyc.* The strigose hairs of the plant called *kiwach* in India, as well as those of *Rottlera tinctoria*, are used in India as an Anthelmintic, whence the practice was probably introduced as well as its corrupted name. Sir. W. Hooker has distinguished the East India plant, *M. prurita* from M. *pruriens*, which is indigenous in the West Indies. The pods of the Kiwach, when young and tender, form articles of diet in India. When ripe, they are of a brownish colour, and covered with innumerable sharp prickle-like hairs, which penetrate into and irritate the skin. *Action Uses.* Mechanical, Anthelmintic. Useful in expelling lumbrici and ascarides, by sticking into their bodies, when pressed against the intestinal, and thus irritating and dislodging them *D.* The pod being dipped into treacle or honey have the hairs scraped off until they have the consistency of an electuary when a table-spoonfu may be given to adults, and a tea-spoonful to children, followed by a purgative of Castor Oil &c.—*Royle.* The cowhage, or cow-itch, with its stinging pods is very common in the Karer jungles. Mr. Mason thinks it is the commo species, but he never met with the plant in flower —*Mason.*

(5468) MUCUNA PRURITA, Cowitch, ha purple flowers in compact ovate racemes; leaflet hairy beneath, the middle one rhomboidal an obtuse, the lateral ones dilated on the outer edge the legumes are oblong, curved, compressed, no keeled, and covered all over with a thick coatin of erect white stinging hairs, which turn black i drying and brown when ripe. It is a nativ of the hedges and banks of the East Indies.—*Eng. Cyc.*

(5469) MUDAR. Yercum nar, or Mudar o Ak, are names applied to the fibres of the *Calotro pis gigantea*, the gigantic swallow, wort, also t the C. Hamiltonii, a plant which is widely diffuse throughout the southern provinces of the penin sula of India where it grows wild, preferring poor soil near the sea. It is replaced in the Bellary district, C. by procera, which is equally common and in Northern India by C. Hamiltonii.

(5470) MUDAR BARK. AKUND. Bark of root of Calotropis gigantea.—*Beng. Phar.*

(5471) MUDUD, pills of the size of a pepper corn, made of chopped betel leaf and opium : and smoked in a small chillum.—*Herklots.*

(5472) MUEDA LUKREE. Wood of Tetranthera Roxburghii.—*Beng. Phar.*

(5473) MUGILIDÆ, the Mullet Tribe, a family of Fishes of the order *Acanthopterygii.* This family may be distinguished by the following characters :—Body nearly cylindrical, covered with large scales : dorsal fins two in number separated, the first with only four spinous rays ; the ventral fins have their origin a little behind the line of the pectorals ; branchiostegous rays, six. The head is somewhat depressed, and, like the body, is covered with large cales or polygonal plates ; the muzzle is very hort ; the mouth is transverse, and when closed orms an angle, the lower jaw having an emi- ience in the middle, which fits into a corres- onding hollow in the upper ; teeth very mi- ute ; pharyngeal bones much developed. There re three genera belonging to this family—*Athe- ina*, *Mugil*, and *Tetragonurus.*

Atherina has the body rather elongated ; two orsal fins widely separated ; ventral fins placed r behind the pectorals ; sides with a broad ongitudinal silver band ; teeth minute ; branchi- stegous rays 6.

Mugil has the body nearly cylindrical, overed with large scales ; two dorsal fins idely separated, the rays of the first fin spin- us, those of the second flexible ; ventral fins be- ind the pectorals ; middle of the under jaw ith an elevated angular point, and a corres- onding groove in the upper ; teeth small ; ranchiostegous rays 6.

Tetragonurus, so named from the project- g keels or riges on each side, near the se of the caudal. There is only one spe- es, an inhabitant of the Mediterranean, about foot long, and black, and reputed to be poison- s.—*Eng. Cyc.*

(5474) MUGIL, MULLET LARGE. A species mullet is very common in Tenasserim and is en seen on the tables of Europeans, by whom is highly esteemed. Mr. Blyth, to whom I nt a specimen for the determination of the spe- s, wrote that it was abundant in Calcutta, but s of a species I could never determine from scriptions."—*Mason.*

(5475) MUKHUM SEEM. DOLICHOS GLA- ATUS. Sabre Bean. This is a large kind of n, sown at the same time as others ; it re- ires strong support to run over. The beans are dressed as French beans but are not so tender.—*Riddell.*

(5476) MULBERRY. MORUS INDICA.

(5477) MULLET FISH. MUGIL CEPHALUS.

Maddava meen, TAM.	Bonta, TEL.
Arabic mutchie, DUK.	Puhin, HIN

Ain's Mat. Med. p. 155.

(5478) MULLET, MUGIL CEPSALOTUS, *Valenciennes*, large eyed. The Tenasserim seas have another mullet, equally valuable for the table with the last, and equally common in Calcutta, but distinguished among other things by its small head, smaller scales, and goggle eyes which appear to be starting out of its head.—*Mason.*

(5479) MULLET. MUGIL SUBVIRIDIS, *Valenciennes*, small. A small mullet is often found in great numbers in the river near Maulmain, which many of the Burmese regard as the young of the preceding, but it is a distinct species, of which Mr. Blyth wrote that he had never seen it before, but had " made it out to be as above." —*Mason.*

(5480) MULLET. [MUGILIDÆ ; MULTUS.]

(5481) MULLUS, a genus of Fishes belonging to the group *Acanthopterygii* and the family *Percidæ.* The species have the body thick oblong ; profile of the head approaching to a vertical line ; scales large, deciduous ; two dorsal fins widely separated, the rays of the first spinous, those of the second flexible ; teeth on the lower jaw and palate only ; two cirri at the symphysis of the lower jaw ; branchiostegous rays 4. There are two species of this genus found in Europe, and both are inhabitants of the seas of Great Britain.

(5482) MULMURACA, the Tamil name of a tree which grows to about twenty-four inches in diameter, and twenty feet in height. It is used by the natives for canoes, catamarans, and many other purposes. It produces a fruit which, with the leaves of the tree, is used medicinally.—*Edye. Ceylon.*

(5483) MUM. A fermented liquor, brewed principally from the malt of wheat.—*Faulkner.*

(5484) MUNDAREKAI, TAM. This article Ainslie had never seen. It grows in the extreme Southern parts of the Peninsula, and is eaten by the common people.—*Ainslie, p.* 241.

(5485) MUNGEVENAH, the Tamil name of a Ceylon tree which grows to thirty inches in diameter, and eight feet long. It is close in its grain and light. It is used for gun-stocks, poles of palanquins, sandals, &c. It produces a fruit which is of little use. It is on the fruit of this tree that the monkeys, pea-fowl, &c. feed.—*Edye. Ceylon.*

(5486) MUNJEET, INDIAN MADDER.

Munjeet, GUZ. & HIND.

Rubia Munjistha, or Indian madder root, growing in various parts of India, Persia, &c. It is used in dyeing, and is applied to the same purposes as Europe madder. The roots are long, about the thickness of a quill, with a smell somewhat resembling liquorice-root. Munjeet is largely imported into Bombay from the Persian Gulf and Kurrachee, and is chiefly re-exported to England.—*Faulkner*. See MADDER.

(5487) MUNJUN. A tooth powder, made of burnt almond shells; or common charcoal: or charcoal made from myrobalans or betel nuts.—*Herklots.*

(5488) MUNSOOR ALI KHAN. An almost direct road from Hoomayoon's tomb near Delhi, leads to a mausoleum of some celebrity, viz. that of (Nawab Munsoor Allee Khan,) Sufdur Jung, one of the Omrahs of Delhi. Before the accession of the British dominion, he and his ancestors, it is said, held the Soobahdaree of Oude. This native nobleman's remains were either interred here or the building answers the purpose of a cenotaph. It is a substantial work of red stone so common in many of the edifices of Delhi. It is in many parts relieved with marble, is surmounted by a large white marble dome, forms a structure of some magnitude and is said to be about 150 years old. The tomb stone on the upper floor and on a line with the sarcophagus is a chaste piece of sculpture of white marble, and the leaves which surround its base form an excellent and neat specimen of the power of the chisel in the hands of art. The mausoleum is situated in the centre of a large area of enclosed ground laid out into a fine garden and occupies an isolated position on the main road which connects Delhi with the Kootub.—*Tour in India by French, p.* 13.

(5489) MURÆNIDÆ, OR ANGUILLIDÆ, a family of Fishes belonging to the Apodal section of the *Malacopterygii*. These fishes have an elongated and often cylindrical body, covered by a thick and soft skin in which the scales are deeply imbedded and scarcely apparent. They have no cæca, but nearly all are furnished with a natatory bladder. In the first group, which constitutes the great genus *Muræna* of Linnæus, the opercula are small, and enveloped in the skin; the gill-opening is small, and is situated far back, an arrangement which, by more completely protecting the branchiæ, permits these fishes to live a long time out of water. They have no ventral fins. The species of the genus *Anguilla* are distinguished by the possession of pectoral fins; the dorsal, anal, and caudal fins are united, the dorsal commences at a considerable distance behind the pectorals; the upper jaw is shorter than the lower; the gills opening by a small aperture on each side, situated beneath the pectoral fin. Three if not four species of *Anguilla*, or Eel, are found in Britain—the Sharp-Nosed Eel, the Broad-Nosed Eel, and the Snig.—*Eng. Cyc.*

(5490) MURIATIC ACID, MARINE ACID, SPIRIT OF SALT, HYDROCHLORIC ACID, CHLOROHYDRIC ACID.

Loona rasa, CYNG.
Acide Hydrochlorique, FR.
Salzsaure, Chlorwasserstoffsaure, GER.
Nemuk ka Teezab, HIND.
Acidum Muriaticum, Spiritus Salis, LAT.
Ooppoo travagum, TAM.
Lawana travagum, TEL.

This acid is a solution of the gas in water. Geber and the Arabs were probably acquainted with it, and the Hindoos knew it by a name equivalent to *Spirit* or *sharp water of Salt.* This is the Commercial acid, and is always of a yellow colour. It commonly contains as impurities a little Sulphuric Acid, Nitrous Acid, Perchloride of Iron, Chlorine, and Bromine. It is prepared by pouring the Oil of Vitriol of commerce on Common Salt in earthen or iron vessels, especially since the extensive manufacture of Carbonate of Soda from Sulphate of Soda. Its Density,= 1180.—*Royle, p.* 46.

(5491) MURICIA COCHINCHINENSIS. A native of China, Cochin China, a large shrub, berry large, reddish purple, scentless, insipid: seeds and leaves aperient, and used by the Chinese in obstructions of the liver, "tumors, malignant ulcerations, &c." externally employed in fractures, and in dislocations. (Lindley).—*OSh p.* 351.

(5492) MURIDÆ, the name of an extensive family of Rodents, comprising, when taken in it largest sense, a great number of genera and species, which, though none of them attain to an considerable size, become worthy of serious notic from their prodigious multiplication and the destructive influence which they exert over vegetation and the fruits of the labour of the agriculturist. The type of this family is found in the genus *Mus*, to which our Common Rats and Mic belong. The Linnean genus *Mus* is thus characterised in the last edition of the 'Systema Naturæ:'—'Dentes primores inferiores subulati and, as might be expected from such a definitio it is made the receptacle not only for such Rodents as are vernacularly known as Rats and Mic but for the Guinea Pig, the Agoutis, the Pac in short, for all the *Glires* then known, not arranged under the genera *Hystrix*, *Liqus*, *Casto* and *Sciurus*. The remaining genus (*Noctilio*), placed by Linnæus among his *Glires*, belongs to th Bats. [CHEIROPTERA.] Pallas concurred wi Linnæus in uniting under one great genus (*Mu* all the Rodents provided with clavicles which h no striking external distinction, such as the t of the Squirrel or the Beaver. Mr. Swainso in his 'Classification of Quadrupeds' (183 also separates the *Glires* into two divisions: t first, or *Glires* proper, with clavicles; and t second with rudimentary clavicles, or none. the first division, after the genera *Castor*, *Fib* and *Myopotomus*, and an observation in a n to the first section, that these divisions are purely artificial, and nearly formed to facilitate the search among so many unarranged groups, we find the following sections :—

1. Rats and Mice, under which are arranged the following :—*Arvicola*, Lacép. (*Hypudæus*, Ill.) Example, *Mus amphibius*, Linn., Water-Rat, Penn. ; *Georychus*, Ill. (Lemmings). Example, *Mus Norvegicus*, Linn., the Lemming. *Echimys*, Geoff. (Spined Rats). Ex. *Echimys cristulus*, Desm., Gilt-Tailed Dormouse, Penn. *Myoxes*, Gm. (Dormouse). Ex. *Mus avellanarius*, Linn, the Common Dormouse. *Hydromys* Geoff. (Water-Rat). Ex. *H. leucogastor*, Austra-ia. *Mus*, Auct. Ex. *M. Rattus*, Linn., Common Rat. *Capromys*, Desm. Ex. *C. prehensilis* South America. *Cricetus*, (Hamster). Ex. *C. vulgaris*, the Hamster.

2. Fore legs very short, hind legs long. Jumping Mice, under which come the following genera and subgenera :—*Dipus* (Jerboa). Ex. *Mus Jaculus*, Linn. (*D. Sagitta*, Dum.) Sub-genus *Gerbillus*, Desm. Ex. *M. Tamariscinus*, Tamarisk Jerboa, Sh. *Meriones*, L. Cuv. Ex. *Meriones Labra-orius*, Sub-genus *Pedetes*, Ill. Ex. *M. Caffer*, Pall., Cape Jerboa, Penn. Then follows *Lagostomus*, *Brookes*, with its sub-genera *Chincilla* and *Logotis*. [CHINCHILLIDÆ.]

3. Tail very short. Mole and Sand-Rats, in-luding *Geomys*, Schmaltz (Sand-Rat). Ex. *Geomys Douglasii*, America. *Diplostoma*, Schmaltz, America ; *Aplodontia*, Richardson. Ex. *A. leporina*, America. *Aspalax*, Guld. Ex. *Mus Typhlus*,. Pall., Asia ; *Bathyergus*, Ill. Ex. *I. maritimus.* Gm., Africa.

4. Tail long, bushy. Squirrels, under which re arranged *Arctomys*, Gm. Ex. *Mus Marmota*, Linn., the Marmot. *Spermophilus*, F. Cuv. Ex. *M. citellus*, Pall., chiefly America. *Sciurus* uct. Ex. *S. vulgaris*, Linn., the Common Squir-el ; together with the sub-genus *Pteromys*, Geoff. nd the genus *Cheriromys*. The numerous forms hich press upon the attention in considering his large section of *Mammala* are enough to onvince any one who has bestowed any thought n the subject that authors have not spoken of the fficulties surrounding it without reason. General ardwicke gives the following interesting account his *Dipus Indicus* :—" These animals are ery numerous about cultivated lands and rticularly destructive to wheat and barley ops, of which they lay up considerable hoards spacious burrows near the scenes of their nder. They cut the culms of the ripening rn just beneath the ears, and convey them thus tire to one common subterraneous repository, ich when filled they carefully close, and do not en for use till supplies abroad become distant d scarce. Grain of all kinds is their favourite od ; but in default of this they have recourse the roots of grass and other vegetables. About e close of day they issue from their burrows, and traverse the plains in all directions to a considerable distance ; they run fast, but oftener leap, making bounds of four or five yards at a time, carrying the tail extended in a horizontal direction. When eating they sit on their hind legs like a squirrel, holding the food between their fore feet. They never appear by day, neither do they commit depredations within doors. I have observed their manners by night, in moonlight nights, taking my station on a plain, and remaining for some time with as little motion as possible. I was soon surrounded by hundreds at the distance of a few yards ; but on rising from my seat the whole disappeared in an instant, nor did they venture forth again for ten minutes after, and then with much caution and circumspection. "A tribe of low Hindus, called Kunjers, whose occupation is hunting, go in quest of these animals at proper seasons, to plunder their hoards of grains ; and often, within the space of twenty yards square, find as much corn in the ear as could be crammed into a common bushel. They inhabit dry situations, and are often found at the distance of some miles out of the reach of water to drink. In confinement this animal soon becomes reconciled to its situation, and docile ; sleeps much in the day, but when awake feeds as freely as by night. The Hindus above mentioned esteem them good and nutritious food." ('Linn. Trans.,' vol. viii.). In the collection of the British Museum the student will find specimens of nearly all the Asiatic *Murida* at present known. The following is a list of the species found in that collection, with the Asiatic countries in which the specimens were found :—

Family *Muridæ.*

a. *Murina.*

Acanthomys Cahirinus, the Cairo Rat. Egypt.

A. affinis, the Allied Acanthomys.

Mus Bandicota (Bechstein), the Bandicoot, or Pig-Rat. Nepaul.

M. nitidus (Hodgson), the Shining Rat. Nepaul.

M. gigas, the Egyptian Bandicoot. Egypt.

M. decumanus (Pallas), the Norway Rat. Great Britain and India.

M. Decumanoides (Hodgson), the Indian Rat. Nepaul.

M. Asiaticus (Gray), the Asiatic Rat. Mexico and India.

M. niviventer (Hodgson), the White-Bellied Rat. Nepaul.

M. Kok (Gray), the Kok. India.

M. Abyssinicus (Ruppell), the Abyssinian Rat. Abyssinia.

M. Ellioti, Elliot's Rat. Madras.

M. rufescens (Gray), the Red House-Rat. India.

M. albipes (Ruppell), the White-Footed Rat. Abyssinia.

M. leucosterum (Ruppell), the White-Crested Rat. Abyssinia.

M. variegatus (Brants), the Variegated Rat. Egypt.

M. Mauci, the Mauci. Madras.

Vandeleuria oleracia (Gray), the Meinalka. Madras.

V. dumeticola, Hodgson's Free Mouse. Nepaul.

Nesokia Hardwickii (Gray), the Nesoki. India.

Golunda Ellioti (Gray), the Galandi. Madras.

G. Meltada (Gray), the Meltada. Madras.

Leggada Booduga (Gray), the Buduga. Madras.

L. platythrix (Gray), the Leggade. Madras.

Phlæomys Cumingii (Waterhouse), the Phlæomys. Manilla.

b. Arvicolina.

Arvicola Roylei (Gray), the Indian Vole. India.

A. (?) *hydrophilus* (Hodgson), the Nepaul. Vole. India.—*Eng. Cyc.*

(5493) MURRAYA. BURMAN BOX-WOOD. The Karens sometimes furnished specimens of a wood that can scarcely be distinguished from the box-wood of Europe, but he had never seen the tree though Mr. Mason has named it a Murraya. Wallich found *Nauclea cordifolia* on the banks of the Irrawaddy, which has "wood coloured like that of the box tree, but much lighter, and at the same time very close grained." It may possibly be the same tree, although the Tenasserim wood is not light; or it may be a Tavoy tree, which he says has "a strong tough wood, in grain like box."—*Mason.*

(5494) MURRAYA EXOTICA. Lin. *Aurantiaceæ.* NAT. BIBZAR OR KOONTIE. This most beautiful shrub is not a native of India so has no Tamool or Teloogoo name. The fragrance of its delicate white flowers is delightful and has procured for it the name of the Honey bush.—*Ainslie's Mat. Med. p.* 162. Dr. Riddell describes it as an ornamental shrub, with beautiful dark green leaves; flowers white, and fragrant in the evening, and commonly known by the name of China-box; it is to be found in most gardens, and is easily grown by layers or cuttings. —*Riddell.* MURRAYA EXOTICA, and PANICULATA and the Aglaia odorata, are cultivated in China as very fragrant shrubs.—*Williams.* Dr. Hooker says that he found the woods of the Rajabat in the Soane valley full of monkeys, and amongst other plants, observed *Murraya exotica*, but it was scarce.—*Hooker Him. Jour. Vol.* I. *p.* 44.

(5495) MURRAYA PANICULATA. COSMETIC BARK. A small tree with pinnate leaves; flowers white and fragrant, appear in Dec. and Jan.; fruit reddish.—*Riddell.* The fragrant bark of this tree which is indigenous in Burmah above Rangoon, is more universally used for a cosmetic than sandal wood. A single specimen has been shown Mr. Mason in Maulmain, which is this very ornamental fragrant flowering shrub of the citron tribe.—*Mason.*

(5496) MURTHY WOOD.

(5497) MURVILINGA, or Marvilingum Maram, the Tamil name of a Ceylon tree which grows to about sixteen inches in diameter, and eight feet high. It is prized by the natives for sandals and toys, &c. It produces a kind of pod, which, with the bark and leaves, is used with much success in cases of intermittent fevers.—*Edye. Ceylon.*

(5498) MUSA, a genus of Endogenous Plants, the type of the natural order *Musaceæ.* The species consist of herbaceous plants, having a gigantic simple stem, thickly clothed with the sheathing petioles of long, broad, horizontal leaves, which form a tuft, like that of some palm, on the apex of the stem. These leaves are of a firm but thin texture, and are undivided; but having simple veins running directly from the margin towards the midrib, and presenting a broad surface to the wind, they are always torn into broad strap-like divisions, which give them a compound appearance. From the midst of these leaves proceeds the inflorescence, consisting of a compound spike of great size, each of whose divisions is inclosed in a large bract or spathe, loaded with male flowers at its base, but bearing females or hermaphrodites at the upper end. The perianth consists of 6 superior divisions, five of which are grown together into a tube, slit at the back, while the sixth is small and concave. There are 6 stamens, one or more of which are imperfect. The ovary is inferior, 3-celled, with the double row of numerous ovules in each cell; the style is short; the stigma is funnel-shaped, and obscurely 6-lobed. The fruit is an oblong fleshy body, obscurely 3-5-cornered, containing numerous seeds buried in pulp. The latter are roun dish, the size of a pea, flattened, with a har brittle shell, which is indented at the hilum This genus is one of the most important of thos found in tropical countries, to which the specie are confined in a wild state. The *M. Sapientum*, or Plaintain, of which the Banana, or *M paradisiaca*, is a slight variety, has fruit use to a prodigious extent by the inhabitant of the torrid zone; and, from its nutritiou qualities and general use, it may, whether use in a raw or dressed form, be regarded rathe as a necessary article of food than as an occasional luxury. In equinoctial Asia and Americ in tropical Africa, in the islands of the Atlant and Pacific ocean, wherever the mean heat the year exceeds 24 centigrade degree (75° Fahrenheit), the plantain is one of the most interesting objects of cultivation for the subsistance of man. Three dozen fruits will maintain a person, instead of bread, for a week, and even appears a better diet in warm countries. Indeed the plantain is often the whole support of an Indian family. The fruit is produced from among the immense leaves, in bunches weighing from 30 to 80 lbs., of various colours, and of great diversity of form. It usually is long and narrow, of a pale-yellow or dark-red colour, with a yellow farinaceous flesh. But in form it varies to oblong and nearly spherical; and in colour it offers all the shades and variations of tints that the combination of yellow and red, in different proportions, can produce. Some sorts are said always to be of a bright-green colour. In general, the character of the fruit to an European palate is that of mild inspidity; some sorts are even so coarse as not to be edible without preparation. The greater number however are eaten in their raw state, and some varieties acquire by cultivation a very exquisite flavour, even surpassing the finest pear. In the better sorts the flesh has a fine butter-yellow colour, is of a delicate taste, and melts in the mouth like marmalade. To point out all the kinds that are cultivated in the East Indies alone would be as difficult as to describe the varieties of apples and pears in Europe, for the names vary according to the form, size, taste, and colour of the fruits. Sixteen principal kinds are described at length by Rumphius, from which all the others seem to have diverged. Of these the worst are, Pisang Swangi, Pisang Tando, and Pisang Gabba-Gabb; and the best are the round soft, yellowish sorts, called Pisang Medji and Pisang Radja. Some cultivators at Batavia boast of having 80 sorts. Rheede distinguishes 14 varieties by name, as natives of Malabar. In Sumatra alone 20 varieties are cultivated, among which the Pisang Amas, or Small Yellow Plantain, is esteemed the most delicate, and next to that the Pisang Raja, Pisang Dingen, and Pisang Kalleé. In the West Indies, plantains appear to be even more extensively employed than in the eastern world. The modes of eating them are various. The best sorts are served up raw at table, as in the East Indies, and have been compared for flavour to an excellent reinette apple after its sweetness has been condensed by keeping through the winter. Sometimes they are baked in their skins, and then they taste like the best stewed pears of Europe. They are also the principal ingredient in a variety of dishes, particularly in one called mantague, which is made of slices of them fried in butter and powdered over with fine sugar. Of the many cultivated sorts, that called by the French La Banane Musquee is considered the best; it is less than the others, but has a more delicate flavour. There are uncoloured figures of the plantain fruit in Rheede's 'Hortus Malabaricus,' vol. i., plates 12, 13, and 14; and coloured ones in Tussac's 'Flore des Antilles,' plates 1, 2. All hot climates seem equally congenial to the growth of this plant; in Cuba it is even cultivated in situations where the thermometer descends to 7 centesimal degrees (45° Fahrenheit), and sometimes nearly to freezing point. There is a hardy variety called Camburi, which is grown with success at Malaga. The Plantain prefers a rich fat soil; for in sandy places, where it flowers abundantly, it produces no fruit. In the climates that suit it, there is no plant more extensively useful, independently of its being an indispensable article of food. A tough fibre, capable of being made into thread of great fineness, is obtained from its stem; and the leaves, from their breadth and hardness, form an excellent material for the thatch of cottages. An intoxicating liquor is also made from the fruits when fermented, and the young shoots are eaten as a delicate vegetable. The Banana of hot countries is a mere variety of the Plantain, distinguished by being dwarf, with a spotted stem and a more delicate fruit. Botanists call it *Musa paradisiaca*, in allusion to an old notion that it was the Forbidden Fruit of Scripture; it has also been supposed to be what was intended by the grapes, one bunch of which was borne upon a pole between two men, that the spies of Moses brought out of the Promised Land. The only argument of any importance in support of the latter opinion is, there is no other fruit to which the weight of the fruit of Scripture will apply. All the genus is Asiatic; the wild plantain is found in the forests of Chittagong. where it blossoms during the rains; *M. coccinea*, a dwarf sort, with a stem not more than 3 or 4 feet high, is found in China; *M. ornata* and *M. superba* inhabit the forests of Bengal: *M. glauca* is from Pegu; *M. textilis* is from the Philippines, where it furnishes the valuable thread called Manilla Hemp. There is also in the gardens of England a plant called *M. Cavendishii*, not above 3 feet high, and fruiting abundantly at that size, the origin of which is said to be Mauritius.—*Eng. Cyc.* The name of this family of plants, derived from *Musa*, is, so classically sounding, that we are apt to forget its probably oriental origin. For being natives of tropical countries, though often extending beyond such limits, and having the name of *mauz* or *moz* applied to one of the species by old Arabic writers, there is very little doubt of this being the source of the name *Musa*. This is now applied to the genus which produces the fruits commonly known as Plantains and Bananas; as also the fibre so well known under the name of Manilla Hemp. The Plantain was undoubtedly known by description both to the Greeks and Romans, for Theophrastus, among the plants of India, describes one as having fruit which serves as food for the wise men of India: and which was remarkable both for its sweetness and for its size, as one would suffice for four men—referring most propably to a bunch of plantains. Pliny, evidently describing the same plant, informs us that its name was *Pala*, Garcias, in comparatively modern times, describing the plantain, states that its name on the Malabar coast was *Palan*. The plants of Musa are conspicuous for their size among herbaceous plants. They are devoid of true stems, but form a spurious stem, often of considerable thickness, from the leaves, as they rise from the root-stock, being sheathing at their base, encircling each other, and enveloping, layer within layer, the slender flower and fruit-stalk. This, rising through the centre, projects and hangs down from the top of the sheathing part of the leaves. These, at this point, expand into broad, and at the same time long laminæ or blades, in which numerous parallel veins proceed at right angles from the thick midrib to the margin of each leaf. As these veins do not anastomose and form a network as in ordinary leaves, the leaves are apt, when blown about by the wind, to be divided into innumerable narrow shreds, which are still attached to the midrib. This appearance, no doubt, suggested and justifies the leaves being said to be like ostrich feathers. Every part, both of the sheathing and the exposed parts of these leaves, abounds in fibre. The species of Musa are found in hot and tropical parts of the world, as in the Philippine Isles, where *Musa textilis* is indigenous, as well as in those of the Indian Archipelago, where the edible species are common. From thence they extend northwards as far as Japan; while in China are found *Musa coccinea* and *Cavendishii;* also along the Malayan Peninsula to Chittagong—*M. glauca* being indigenous in the former, and *M. ornata* in the latter locality. In the valleys of the south of the Peninsula of India and of the Dindygul Mountains, *M. superba* is found. The common edible varieties of *M. paradisica* flourish even in the poorest soils, and also near brackish water. They are extensively cultivated at stations in the interior. On the Malabar coast, the Plantain is everywhere at home. The fruit of those at Bassein is especially well-flavoured, and the plant is particularly abundant in the district of Broach. If from the west we return to the east of India, we find the Plantain and Banana most extensively cultivated. The Plantain, according to Dr. Helfer, is to be found in the highest perfection in Tenasserim, especially in province Amherst. More than twenty varieties are known, of which several are peculiar to the country, and the greatest part of them are superior to any to be got in Bengal. They thrive well everywhere without the slightest care. No Burmah or Karen house is to be found without a plantation of Plantains. As the latter leave their abodes, at least every three years, in order to migrate to fresh localities, they are, of course, obliged to leave their Plantain gardens behind them, and therefore these may be found growing luxuriantly in many uninhabited places, until they become choked up by the growth of the more vigorous jungle trees. With the Plantain, as with other long cultivated plants, many distinct varieties are recognised and named, but which it is extremely difficult to arrange in suitable order. But the natives of Bengal generally prefer the large and coarse-fruited kinds, called Plantain; while the smaller and more delicately tasted fruit, known as the Banana is alone esteemed by Europeans. These are cultivated in the most northern, as well as in the southern parts of India; while along the jungly base of the Himalayas there is a suitable climate as far as 30° of north latitude, for plants of this genus growing in a wild state. That growing in Nepal has been called *M. nepalensis*. A similar species may be seen growing below the Mussoore range, as well as near Nahn. The fruit, however, in all these situations, consists of litttle else than the hard dry seeds. [A similar variety of *Musa sapientum*, having seeds surrounded with a gummy substance, instead of fruit-like pulp, was found by Dr. Finlayson, on Pulo Ubi, near the southern extremity of Cambodia. In Batavia also, there is stated to be a variety full of seeds, which is called *Pisang batu*, or *Pisang bidju*—that is, Seed Plantain. In Kemaon and Gurhwal it is cultivated at as great an elevation as 4000 and 5000 feet above the sea, and has been seen as far north as the Chumba range at an equal elevation. Major Munro has seen the wild Plantain at 7000 feet above the sea, in the Khondah slopes of the Neilgherries. Though many of the above have been mentioned as distinct species, it is probable that some, at least, are only varieties. "Baron Humboldt has suggested, that several species of Musa may possibly be confounded under the names of Plantain and Banana, and that some of these may be indigenous to America; but as stated by Mr. Brown, nothing has been advanced to prevent all the cultivated varieties being derived from one species, *Musa Sapientum* (also called *M. paradisiaca*), of which the original is the wild Musa, described by Dr. Roxburgh as grown from seed received from Chittagong. Mr. Brown further adds, that it is not even asserted that the type of any of those supposed species of American Banana, growing without cultivation and producing perfect seed, have anywhere been found." ('Illust. of Himal. Bot.,' p. 355.) If the Plantain and Banana are therefore natives of Asia, which have been introduced, probably, by the Spaniards into America, no plants can more strikingly display the benefits derivable to one country from introducing the useful plants of another which is similar in climate. For Plantains and Bananas are now extensively cultivated in various parts of South America, and at an elevation of 3000 feet in the Caraccas. They are abundant in the West India Islands, as well as at considerable elevations in Mexico. To the negroes in the West Indies, the plantain is invaluable, and like bread to the European, is with them denominated the staff of life. In Guiana, Demerara, Jamaica, Trinidad, and other principal colonies, many thousand acres are planted with the Plaintain. But, before proceeding to treat of the Plaintain and Banana, it is desirable to notice the species which yields Manilla Hemp, showing how valuable some of these plants are, on account of their fibres —*Royle Fib. Plants.*

(5499) MUSACEÆ, *Musads*, a natural order of Endogens, of which the genus *Musa* is the representative. They are stemless or nearly stemless plants, with leaves sheathing at the base and forming a kind of spurious stem, often very large; their limb separated from the taper petiole by a round tumour, and having five parallel veins diverging regularly from the midrib towards the margin. Flowers spathaceous: perianth 6-parted, adherent, petaloid, in two distinct rows, more or less irregular; stamens 6, inserted upon the middle of the divisions, some always becoming abortive; anthers linear, turned inwards, 2-celled, often having a membranous petaloid crest; ovary inferior, 3-celled, many-seeded, rarely 3-seeded; ovulus anatropal; style simple; stigma usually 3-lobed. Fruit either a 3-celled capsule, with a coculicidal dehiscence or succulent and indehiscent. Seeds continuous, surrounded by hairs, with an integument which is usually crustaceous; embryo orthotropal, oblong-linear, or mushroom-shaped, with the radicular end touching the hilum, having pierced through the mealy albumen. The species are stately and always beautiful herbaceous plants with the aspect of a plantain, and with large bracts and spathes, which are usually coloured of some gay tint. The characteristic marks of the order are to have an inferior ovary, with very irregular and unsymmetrical flowers, whose sexual apparatus is not consolidated. It is chiefly by these distinctions that it is known from *Amaryllidaceæ*. In some the fruit is fleshy, as in the Plantain; in others it is dry and capsular. Only 4 genera are known of this order, consisting of about 20 species, all of striking beauty. *Heliconia* is the principal American form nearly all the others being found in the Old World; of these the species are conspicuous for their brilliantly-coloured rigid boat-shaped bracts, sometimes yellow, sometimes scarlet and even a mixture of both. The species of *Strelitzia* are Cape plants with rigid glaucous leaves, and singularly irregular flowers of considerable size, coloured yellow and blue or pure white. Finally, the Ravenula of Madagascar (*Urania speciosa*), a noble palm-like plant, is remarkable for the brilliant blue colour of the lacerated pulpy aril which envelopes the seeds; the latter are used for dyeing in Madagascar, but none of the order are of any important use to man, with the exception of the Musas themselves. [MUSA.]

(5500) MUSA PARADISIACA. Lin.

Valie pullum, TAM.
Maoz, DUK.
Arittie pundoo, TEL.
Pesang, MALAY,
Vallacoy, MAL.
Cadali, SANS.

The flower.

Valei poo, TAM.
Arittie poo, TEL,
Plantain flower. ENG.
Cadali, SANS

Ainslie's Mat. Med. p. 261.

Of this delicious fruit there is a great variety in lower India, three of the most esteemed sorts are the Rajah plantain, the red and the yellow. Plantains in their green state are sliced and made into curry, when they eat not unlike potatoes. The natives particularly the Mahometans consider plantains as highly nutritious and eat them with cows milk and sugar as we do strawberries. —*Ainslie*, *p.* 234. The plantain and Banana, though probably only varieties of one species, are yet sufficiently distinguished by the size and flavour of their fruit, to be considered familiarly as distinct. They are, from their luxuriant-growing and large overhanging leaves, considered among the most characteristic forms of tropical vegetation. They are also among the most valuable of plants, inasmuch as in some countries they supply the place of bread, and form the chief nutriment of the people. But not only does the Plantain supply the place of bread and serve as fruit, but also in a preserved state as desert. The farinaceous parts may, moreover, be separated in the form of flour, and are probably as nutritious as rice. The shoots or tops of the young plants, both in the East and the West, are occasionally given as fodder to sheep and cattle, and are described by some as a delicate edible. The leaves, in a dried state, are used for thatching and bedding. Both the stem and leaves abound in fibre, useful for textile or cordage purposes, while the tow which is separated in preparing the fibres, forms an excellent material for the finest or the toughest kinds of paper. The illustrious Humboldt has long since remarked, that the Banana is for the torrid zone what the Cerealia are for Europe and Western Asia, or rice for Bengal and China, forming a valuable cultivation wherever the mean temperature of the year is about 75°. He has also calculated that the same extent of ground, when planted with the Banana, will support a far greater number of people than when planted with wheat. As this is a point of great economical interest, it has been a subject of subsequent investigation. The productiveness has been found to differ with the mean temperature of the place. Boussingault has given the following as the produce, per imperial acre, of the raw fruit in three places, according to Humboldt's (1), Gondot's (2), and his own observations (3):

	Temperature.	Produce, per imperial acre.	Or of dry food, per acre.
(1) In warm regions	81½ Fah.	72 tons.	19½ tons.
(2) At Cauca	78⅕ ,,	69 ,,	16 ,,
(3) At Hague	71⅔ ,	25 ,,	6¾ ,,

Professor Johnston is the authority for the last column, or that of dry food per acre, as he had, from his analysis, obtained 27 per cent. of nutritive matter from the Banana. He justly observes, that all these quantities are very large, and show how easily life may be supported in tropical countries. And further, that as potatoes contain about one fourth their weight of dry nutritive matter, it would require a crop of twenty-seven tons of potatoes per imperial acre, to yield the smallest of the quantities above mentioned as the yield of an acre of Plantains; while only twenty to twenty-four tons of potatoes are obtained in favourable seasons and localities. Though it is not probable that the Plantain is cultivated in India, with the care to enable the largest possible quantity of produce to be obtained, yet there is no doubt that the produce is large and the culture most simple. It would be an interesting subject of experiment for the Agricultural Societies of India, to ascertain which are the most productive varieties; whether the modes of cultivation adopted in that country have attained the highest limits of productiveness; and also to determine the best methods for preserving the fruit in different places; and also, when superabundant, whether its meal might not be preserved for periods of scarcity, or for the season of pthe year when the fresh fruit is not rocurable. In South America the fruit is not only used as an article of diet in its fresh state, but, when dried, forms an article of internal trade, besides having its flour separated, and cooked or made into biscuits. It is also preserved in the Society Islands. The preservation of the fruit and the preparation of the meal has already been introduced into India. Some Plantain meal was sent to the Exhibition of 1851, from Madras, as well as baked Plantains from Jessore, by the Rev. J. Parry. These, after some years, are still in good preservation and well tasted. The late Dr. Stocks, and the loss is great which Science and the East India Service have sustained, in the death of this accomplished naturalist, who was as remarkable for the variety of his attainments, as for his zeal for botanical science and its application to practical purposes, informed Dr. Royle that the Plantains at Bassein, where the cultivation is most extensive, are delicious in flavour, and that there the people had acquired the art of preserving them. But this was practised many years ago in Central India, and in Ceylon in 1840, the late Sir John Robison, Secretary of the Royal Society of Edinburgh, wrote to Dr. Royle some years since: "Among the products of India which, I think, might be easily brought into general sale in England, are some of the fruits which, if cut in slices and dried in the sun, would become as susceptible of transport, as those of the Levant and the South of France. Above all, the Banana, of which the varieties, which are rich in saccharine matter, make an admirable preserve, on being skinned and split longitudinally and dried in the sun, by which process they immediately acquire a consistence like Turkey figs, and become capable of being packed and preserved in the same way." He concludes by stating: "I was in the habit of having large quantities preserved every year in this way at Hyderabad, and of using them as an article of dessert at table." In treating of the culivation of species of Musa or Plantain in India for fibre, it is desirable to advert to the cultivation of the edible species, or the numerous varieties included under the names of Banana and of Plantain, and suggesting them as above as subjects of experiment to members of the Agricultural Societies in India, to ascertain whether the modes of cultivation adopted in India have attained the highest limits of productiveness; and also whether the fruit might not be preserved in different forms. Dr. Royle has already observed that a remarkable instance of the great length of time for which these Plantains may be preserved in an eatable state, occurred at the Exhibition of 1851. There were some preserved Plantains, "Plantano pasado," which had been brought home by Lieut.-Col. Colquhoun, R.A., from the province of Jatisco (Guadalaxara), Mexico, in the year 1835, and which since then had remained neglected in a baggage warehouse. The specimen exhibited was the remainder of a package of 75 lb. weight, made up, as customary, in the leaves and fibre of the plant, after having been subjected to considerable pressure. The state of preservation, after sixteen years, was favorably reported on by Dr. Lindley, and no signs of decomposition were then perceptible in the specimens given to Dr. Royle by Colonel, now Sir W. Reid; the sugar of the fruit having been sufficient to preserve them. They are prepared in considerable quantities in the hot region (tierra caliente) of the western coast of Mexico, for consumption in the elevated districts of the interior. The Silver Medal of the Society of Arts was awarded for the first samples brought to England. *See* the 'Transactions,' vol. l, p. 43, for the method of preparation, reprinted in 'Trans. Agric. Soc. of India,' viii, p. 60. Before, however, proceeding to detail the methods of preservation of the fruit, or the preparation of the meal, it is desirable to notice the relative values of these as compared with other kinds of fruit. This we are enabled to do from an excellent

Report 'On the composition and nutritive value of Plantain Meal,' by Professor Johnston, published in the 'Journal of the Highland and Agricultural Society of Scotland,' in 1848, and to which attention called by Professor Key, of Madras. By this we shall see that, in extending the culture of the Plantain, there is no probability of this ever becoming so extensive as for its fruit to become valueless.

CHEMICAL ANALYSIS OF PLANTAIN FRUIT AND MEAL.

Extracts from a Report upon the 'Properties of the Plantain Meal.'—This meal is of a slightly brownish colour, and has an agreeable odour, which becomes more perceptible when warm water is poured upon it, and it has a considerable resemblance to that of Orris root. When mixed with cold water, it forms a feebly tenacious dough, more adhesive than that of oatmeal, but much less so than that of wheaten flour. When baked on a plate, this dough forms a cake which s agreeable to the sense of smell, and is by no means unpleasant to the taste. By washing with water this dough leaves a residue of insoluble enacious gluten, as that of wheaten flour does. When filtered from the starch, the wash water gives no cloudiness when rendered slightly sour by Acetic Acid, when boiled yields a little coagu-ated albumen. Whether this is the case in he fresh fruit, or only in the dried meal prepared from it, I have had no opportunity of determining. The addition of Alcohol to the same watery solution renders it more or less distinctly gelatinous, as it does similar solutions obtained rom other fruits, and form the turnip, parsnip, &c. This shows the presence of pectin, or pectic cid, the substance which in fruits, in the turnip, nd in many other bulbous roots, takes the place f the starch found in grain, and in the tubers of he potato. When boiling water is poured over he meal, it is changed into a transparent jelly aving an agreeable taste and smell. If it be oiled with water, it forms a thick gelatinous mass, very much like boiled sago in colour, but ossessing a peculiar, pleasant odour.

Composition of the Plantain Meal.—By a careful analysis, the composition of the plantain meal was found to be nearly as follows :

a. The water.—Mr. Law states that 59 parts f the fruit yielded only 30·85 of eatable parts, hich, on drying in the air, were reduced to 2·32 parts. The fruit, therefore, consisted in 100 arts of—

	Per cent.
Husks, &c.	47.71
Water evaporated by the sun	20-88
Meal dried in the sun	31.41
	100.00

The meal thus dried in the open air, when dried again in the laboratory at 212° Fahr., lost 4·07 per cent. of water in addition ; or one hundred parts of the recent fruit contain 27 of dry nutritive matter.

b. The albumen, &c.—By combustion the proportion of nitrogen in this meal, in its ordinary state, was found by Dr. Fromberg, in two experiments, to be 0·88 and 0·97 respectively, equal as a mean to 5·82 per cent. of protein compounds These, as we have already seen, are most probably in the state of soluble albumen taken up by cold water, and of coagulated albumen attached to, or mixed with, the starch, cellular fibre, &c. In the perfectly dry meal the proportion is 6·75 per cent.

c. The ash.—When burned in the air, the proportion of ash left behind amounts to 2·32 per cent., or in the dried meal to 2·71 per cent. The entire composition of the plantain meal is represented in the following table :

	Dried in the air.	Dried at 212. Fah.
Water, ...	14·07	
Starch, ...	67·42	78·43
Gum and Pectin, ...	4·47	5 21
Cellular fibre, ...	4·84	5·62
Sugar, ...	2·03	2·40
Oil, ...	0·41	0·48
Albumen (soluble), ...	1·21	1·41
Albumen (coagulated gluten, &c.);	3·23	3·74
Ash, ...	2·32	2·71
	100 00	100·00

On comparing the above composition with that of other kinds of food commonly eaten by man, we find the plaintain *fruit* to approach most nearly in composition and nutritive value to the potato, and the plantain *meal* to those of rice. Thus the fruit of the plantain gives 27 per cent., and the raw potato 25 per cent. of dry matter. Again, the dry mealy matter of the plantain, of the potato, and of rice consists respectively of—

	Rice.	Potato.	Plantain.
Starch,...	86·9	65·0	78·4
Sugar, Gum, &c.	0·5	15·0	7·6
Fat, ...	0·8	1·0	0·5
Cellular, ...	3·4	8·0	5 6
Protein compounds ...	7·5	8·0	5·2
Ash,...	0 9	3 0	2·7
	100·0	100 0	100·0

or, comparing only the Starch, Sugar, &c., and the protein compounds, on which the nutritive quality of these different vegetable productions principally depends, we have the following numbers:

	Rice.	Potato.	Plantain.
Starch, Sugar, &c. ...	87·4	79·0	86·0
Protein compounds, ...	7·5	8·0	5·2

These numbers show that it approaches, as I have said, nearest in its composition to rice, containing nearly as much starch, but a sensibly smaller proportion of the protein compounds, on which the sustenance of the muscles is supposed chiefly to depend. In regard to its value as a food for man in northern climates, there is no reason to believe that it is unfit to sustain life and health; and as to warmer or tropical climates, this conclusion is of more weight. The only chemical writer who has previously made personal observations upon this point (M. Boussingault) says: "I have not sufficient data to determine the nutritive value of the banana, but I have reason to believe that it is superior to that of potato. I have given as rations to men employed at hard labour about 3 kilogrammes (6½ lb.) of half-ripe bananas, and 60 grammes (2 ounces) of salt meat." Of these green bananas he elsewhere states that 38 per cent. consisted of husk, and the internal eatable part lost 56 per cent. of water by drying in the sun. The 6·6 pounds, therefore, were composed of—

Husk, ...	2·5 lb.
Water, ...	2·3 ,,
Heart dried in the sun, ...	1·8 ,,
	6·6 lb.

so that less than two pounds a day of this dried banana fruit, which we may suppose to be equal in quality and composition to the sun-dried plantain meal, above described, with two ounces of salt meat per day, were found sufficient to maintain men, *not slaves*, at moderately hard labour. This was equal to 12½ lb. dried eatable banana, and 1 pound of salt meat (query fish) per week. * * * The composition of the ash of the Plantain also bears a close resemblance to that of the potato. Both contain much alkaline matter, potash and soda salts, and in both there is nearly the same per centage of phosphoric acid and magnesia. In so far, therefore, as the supply of those mineral ingredients is concerned, by which the body is supported as necessarily as by the organic food, there is no reason to doubt that the banana, equally with the potato, is fitted to sustain the strength of the animal body. It must not be denied that our present knowledge indicates the advantage of a mixture of food, as the most conducive to health and strength, but experience shows that however desirable, this is not absolutely necessary. The oat alone in Scotland raises and supports strong men; rye alone does so in the north of Europe; and the potato alone does so in Ireland. This result of experience in the case of the potato justifies us, were there no experience on the subject in tropical countries, in believing that the banana, which resembles it, will do the same. Whatever other reasons may lead us to recommend a mixture of other food with it, especially where *hard* labour, perhaps not a natural condition of things, is required of him, we ought not to base this recommendation upon any belief that the banana, when eaten alone, will not fully supply all the ordinary wants of the living animal.

Cultivation.—The plantain has thus been proved to be valuable on account of its fruit both in its unripe and ripe state, the latter both when fresh and when preserved, and for yielding nutritious meal. The plant is also to be esteemed on account of the fibre with which every part of it abounds. Though both the Plantain and the Banana are to be found near the huts of the poo and in the gardens of the rich, the most profitable mode of culture has, probably, in few place been as yet ascertained. In the first place, o the great varieties to be found in cultivation, it would be necessary to select those whic abound most in the products we chiefly require The small Banana is most esteemed as a fruit b Europeans, and the people of Southern Asia but the large-fruited and, in comparison wit the other, coarse tasted Plantain is preferre by the natives of Northern India, as is the lon yellow Plantain in Jamaica. Both of the latte abound in fibre, and are therefore to be preferre when both this and the fruit are objects of de sire. The culture of the Plantain is, upon th whole, very simple, as it will succeed in almo any soil where the climate is warm and mois The vicinity of water, for cleansing and washin the fibre, will, of course, be an essential. Profe sor Key, of Madras, has stated that in India t Plantain will flourish in the poorest soil a near brackish water, and that its culture mig be extended with very little trouble and expens A sucker being planted, rapidly attains maturit some varieties in eight months, others with the year. Each producing a bunch of fr which may weigh from twenty-five to forty, a even ninety pounds; and each throwing out fr its roots and around its stem, from six a seven to eight and ten fresh suckers. These w each form a distinct plant, producing its own bun of fruit; all requiring to be cut down annual in order to make room for the fresh suckers whi spring up. This may go on for fifteen or twe years, though some think that is better to ren the plantation entirely or partially at shor periods. A chief consideration is the dista at which the original plants should be placed, order to give room for the secondary sucke as well as to allow of free ventilation. So place them at distances of six feet, but it is b ter to have them ten feet apart, either around the boundaries of fields or of gardens, or in rows as a separate plantation. In the latter case, it is recommended that there should be space enough between the rows to allow of the culture of other crops. In some parts of India, the Plantain is employed as a nurse, or to afford shade, to the Betel Vine (itself one of the most valuable of crops), or to young Areca-nut and to Cocoa-nut Palms. By cutting away some of the suckers as they arise at different periods, and allowing others to remain, a supply of fruit, and also of stems for fibre, may be obtained for a great part of the year. In Demerara and Guiana, the Plantains have been injured by some disease, which has impaired their fruitfulness, and consequently, the profits of their culture. It has been recommended to plant them at sufficient distances (as eight feet) o allow of free ventilation, accompanied with good tillage in the intervals and the cultivation of annual crops of Maize, Yams, Sugar-cane, or Eddoes. (Arum.) According to the distances, here may be from 360 to upwards of 400 plants n an acre, each producing, say, on an average, even suckers; making in all from 3100 to 3200 plants in an acre.

Preservation of the Fruit.—The fruit of the Plantain, when ripe, containing a sufficient proportion of nutritive matter may well serve as a portion of the food of the natives of warm ountries. But it is probably as much employed y them before being perfectly ripe, as it is someimes stewed, and at other times fried; and, by he natives of India, dressed in various ways to at with rice. In the West Indies, the fresh Plantain, when boiled whole, forms a mass of onsiderable toughness, and which, when beaten n a mortar, constitutes the *foo-foo* of the egroes. (Simmonds.) When nearly or perfectly ipe, it is pleasantly, or even lusciously sweet, and is in the former state that it is preserved. Col. Colquhoun describes the mode of prepa- on as very simple: "The fruit is gathered when lly ripe, and is laid on light cane frames, ex- osed to the sun. When it begins to shrivel, e outer skin is stripped off. This is stated to e a very essential part of the process, as without the fruit acquires an unpleasant flavour. After is, the drying is completed. During this pro- ess it becomes covered with a white, mealy efflo- scence of sugar, as the fig does under similar rcumstances. For convenience of transport it pressed into masses of about 75 lb. each, and wrapped in plantain leaves. The masses are venty-four inches long by fourteen wide, and ur inches thick. The samples presented to the ociety of Arts were about two years old, suffici- ntly moist, of a consistence and flavour between e date and the fig, very sweet, and without any idity. It is evident that this process of pre- rvation will be found to be of considerable value in other parts of the world, and especially in situations where it is cultivated in larger quantities than the fruit can be consumed. The drying in the sun would be sufficient in dry climates, but baking in ovens seems to be necessary in moist climates, such as Dacca and Jessore. The process seems to be sufficiently well understood in several parts of India. When the fruit is of a good kind, no addition of sugar can be necessary. This subject seemed so worthy of a fair trial in the British West Indies to the Society of Arts, that they offered, in the year 1834, a premium for its encouragement. It seems no less important for the East Indies, especially if any planters should be induced to cultivate the Plantain in large quantities, on account of its fibre, or for the preparation of half-stuff for paper-makers.

Plantain Meal.—Mr. Simmonds describes this meal as prepared by stripping off the husk of the fruit, slicing the core, and drying it in the sun. When thoroughly dry it is powdered and sifted. It is known among the creoles of the West Indies under the name of *Conquin tay*. It has a fragrant odour, which it acquires when drying, and which somewhat resembles that of fresh hay or tea. The flavour of the meal is, moreover, said to depend a good deal on the rapidity with which the slices are dried. Hence, the operation is only fitted for dry weather, unless where a kiln or stove is had recourse to. Above all, the Plantain must not be allowed to approach too closely to yellowness or ripenesss, otherwise it becomes impossible to dry it. The colour of the meal is, moreover, injured, when steel knives are used in husking or slicing; but nickel blades or Bamboo slicers would not injure the colour. On a large scale, some single machine might be adapted to the husking and slicing processes, and the mode tried by which arrow-root is obtained, by scraping and suspension in cold water. It is calculated that the fresh core will yield forty per cent. of dry meal, and that 5 lb. may be obtained from an average bunch of 25 lb. weight; and an acre of Plantain walk of average quality, producing even during the year 450 such bunches, would yield upwards of a ton of meal, the value of which must of course vary in different countries according to the price of other articles of food. In the West Indies it is largely employed as the food of infants, children, and convalescents. In point of nutritious value, we have seen that the fruit approaches the potato, and the meal to that of rice. There can be no doubt, therefore, of the value of this meal, and of the benefit of preparing it, wherever the fruit is produced in larger quanties than it can be consumed.

Preparation of the Fibre—The Plantain has been stated to abound in fibre—indeed, almost, every part of the plant may be said to be available for this product. It is related, that from the upper part of the spurious stems, spiral vessels may be pulled out in handfulls, and are used as tinder in the West Indies. De Candolle has described them as consisting, in Musa, of seven distinct fibres lying parallel, formed into bands ; and La Chesnaye of upwards of twenty, arranged in a spiral manner. M. Mohl describes the secondary cell-membrane as divided into as many as twenty parallel spiral fibres. But these are not the fibres which are separated for economic purposes, nor are they situated on the same side of the vegetable structure. For instance, if we take any separate layer of the Plantain stem—that is, a part of the sheathing footstalk of a leaf—we may observe on its outer side a layer of strong longitudinal fibres, which form a kind of framework or ribs for the support of the structure, which is cellular on its inside. It is on this side that spiral vessels are placed, and next the pith in exogenous plants. They are abundant in the peduncle, or core, as it is often called, of the Musa. As in the Manilla, so in the common Plantain, the fibre is found to be coarse and strong in the outer layers of the sheathing footstalks, fine and silky in the interior, and of a middling quality in the intermediate layers. This fibre is separated by the natives of Dacca, for instance, and is used by them for making the string of the bow with which cotton is teazed (bowed). Much of it is well adapted for cordage. Mr. Leycester (*v. supra*), when calling attention to the fibre of the *Musa textilis* grown in Calcutta, directed attention to the fibres of *M. sapientum* and of *M. ornata*, as fitted to answer as string for all gardening purposes. Mr. Crawfurd is of opinion that the common Plantain most probably afforded the Indian Islands the principal material for their clothing, in the same way that the indegenous species does in the Philippine Islands. The art of making cloth from these fibres seems also to have been known in Madagascar. There is no doubt that the large cultivated Plantain of India contains a considerable quantity of strong fibre, in the same way that the common yellow Plantain does in Jamaica. But it seems well worthy of inquiry, whether the wild, and at present useless Plantains, growing along the foot of the Himalayas and on the Neilgherries, may not yield a stronger fibre than any of the cultivated kinds. The fibre may be easily separated from many parts, by simply scraping it on a stone or flat-board, with a piece of hard, wood ; iron, though frequently used, no doubt injures the colour. In the following directions given by Dr. Hunter ('Art Journal,' Madras, i, pp. 108 and 376) the essentials are attended to, and the fibre is separated in an uninjured state, but the process is probably not the most economical. To prepare the fibres of the Plantain, he rejects the outer, withered layer of leaves, and then strips off the different layers, and proceeds to clean them in the shade, if possible soon after the plant has been cut down. Lay a leaf-stalk on a long flat board, with the inner surface uppermost, scrape the pulp off with a blunt piece of hoop-iron fixed in a groove in a long piece of wood. When the inner side, which has the thickest layer of pulp, has been cleaned, turn over the leaf and scrape the back of it. When a good bundle of fibres has been thus partially cleaned, it ought to be washed briskly in a large quantity of water, so as to get rid, as quickly as possible, of all the pulpy matter which may still adhere to the fibres. It may be readily separated by boiling the fibres in an alkaline ley or in alkaline soaps, but not in the Indian soaps made with quicklime, as these are too corrosive. When the fibres have been thoroughly washed, they should be spread out in thin layers or hung up in the wind to dry. If exposed to the sun when in a damp state, a brownish-yellow tinge is communicated, which cannot be easily removed by bleaching. Exposure during the night to the dew bleaches them, but it is at the expense of part of their strength. If we attend only to what is essential in the above process, we find that all that is required is scraping or pressure to separate the cellular and watery from the fibrous parts. This is followed by careful washing, and sometimes by boiling in an alkaline ley, but the latter part of the process does not appear to be essentially necessary. In the West Indies, according to the complete account of a practical correspondent in Jamaica, as given in Simmonds' 'Commercial Products of the Vegetable Kingdom,' the fibre is separated, either by crushing under rollers in a mill, or by fermentatiom. If by the latter process, there is considerable saving in carriage, as the stems, when cut down, are heaped together near where they have grown, and are shaded from the sun by laying the leaves over them. A drainage of the sap takes place, which is described as having a tanning property, and as discolouring the pieces which lie at the bottom. But several weeks elapse before decomposition is complete, when the fibres can be easily separated from the rest of the vegetable mass. There is little doubt, that besides discoloration, there must be some weakening of the fibre by this process, as we know takes place in India when the stems are steeped in water until some decomposition takes place. It is usual not to cut the stems until fruit has been produced ; "for two reasons—first, that the fruit be not lost, and secondly, that the tree will not have arrived at its full growth and ordinary size, and the fibres will be too tender." This is the reverse of the practice in the Philippines, where the stem is cut before the fruit appears, in order to ensure a better quality of fibre. It would be an interesting experiment for those favourably situated, to ascertain the mode by which the best kind of fibre is produced, and what would be the loss of profit, supposing that the fruit is sacrificed for the sake of the fibre. The stem is described as being cut off about six inches above the ground, and being tender, it may, on being bent down, be cut asunder with a single stroke of a hatchet or cutlass. It is then divided, longitudinally, into four parts, the centre taken out and left to serve as manure, and the pieces conveyed at once to the mill to be crushed. It is said that "one man can cut down 800 trees, and split them in a day." A very convenient size for the rollers of the mill, will be found to be about three feet in length and one foot in diameter. In the process of crushing, care should be taken to separate the tender from the harder layers of fibre. This may be attained by having the rollers of the mill placed horizontally; and if the pieces of Plantain are passed lengthways through the mill the pressure will be uniform, and the fibre uninjured. "In this manner, pass the different sorts of layers separately, and the produce will be about four pounds of fibre from each tree. The stalks of the branches of the Plantain (no doubt the midrib of the leaf is meant) give the best fibre, and a large quantity as compared with the body of the trees; 100 lbs. of the stalk will give 15lb. nett of fibre. In general, if a tree will give 4lb. nett of fibre, the stalks will give 1lb. out of the 4lb. The stalks ought also to be crushed separately, because they are harder than the exterior layers of the tree. About 3000 trees may be passed through the mill in a day. Whilst the experiments were in progress, it was ascertained that, with a single horse, 100 Plantain trees, on an average, were crushed in twenty minutes—giving five minutes' rest for the horse." The quantity of produce from each plant, is the point of greatest discrepancy between the West Indian practice and Dr. Hunter's experiments, as he mentions only a few ounces of fibre as procurable from each plant. But as he rejected the outer parts, and did not include the midrib of the leaves, the discrepancy may be partly accounted for. The combings or tow, separated from the fibres during their preparation, are also of value as a substitute for horse-hair, for stuffing mattresses, &c.; and also the peduncle or core, if pounded into half-stuff for paper-makers. Some of the cellular tissue containing much fibrous matter, might, probably, be converted to the same purposes. In addition to the above processes of crushing and washing, the West Indian account also gives the details of the process of boiling the fibre with carbonate of soda and quick-lime, in order, it is said, to get rid of the remaining vegetable matter, and to bleach the fibre. The different qualities of which, having been crushed separately, are of course to be kept so, and boiled separately. The proportions given in the above account are for making three tons of fibre per day. For this, four large (800-gallon) boilers are required, and about 360 lb. of soda would be consumed, with a proportionate quantity of lime; or the soda, that is its carbonate, may be first deprived of its carbonic acid. This may be done by preparing, in a small separate boiler, the quantity of liquid necessary for a day's consumption, which may be done in about an hour, by taking, by weight, ten parts of soda, six parts of quick-lime, and not less than seventy parts of water. The operation of boiling in the soda ley is said to be important in separating the gluten and colouring matter from the fibres, and also to facilitate their bleaching. The lightest coloured fibres do not require more than six hours to bleach, whilst the darkest will probably take from twelve to eighteen hours. It is advisable to place over each boiler the means of lifting the mass of fibre when boiled, and suffering it to drain into the boiler before it is carried away to be washed. The machinery necessary for cleansing and washing may be of various descriptions—as that used by paper-makers in England, or by coffee-planters and arrow-root growers in the West Indies. The fibre may be dried, by being hung over lines made of the same material. These, when dry, may be pressed and packed. For carrying on the culture of the Plantain on an extensive scale, in the West Indies, it is stated that the materials will cost £2000, buildings £500, purchase of land £1500, working capital £1000 to £5000. The estimated expense in cultivating one quarree or 5½ English acres, in Plantains, will be £30, as the work can be easily performed by one labourer in 300 days, at 2*s.* sterling per day. A quarree will produce 18 tons of mill-fibre, the cost of the preparation of which is as follows:

For workmen's wages, soda, lime, and fuel, at £3 per ton	£54
Freight to Europe, at £4 per ton	72
Manager	30
Duty, insurance, office fees, &c., at £1 per ton	18
	£174

Thus making the total expense of producing 18 tons of fibre £174, or £9 13*s* 4*d.* per ton. By another statement, derived from different data, but somewhat similar sources, it has been calculated that Plantain fibre, in a coarse state, might be laid down in England, at £10 6*s.* 8*d.* But some expense would be incurred in cleansing the fibre for finer purposes. In another account, also taken from West Indian information, it is stated that the cost of well cleaned fibre would amount to £7 1*s.* 3*d.*, to which, of course, freight would have to be added; while half-stuff for paper-makers might, at the same time, be produced from the refuse at about half that sum. As Plantain fibre has not yet, as far as we have heard, been systematically prepared as an article of commerce, these calculations of cost are somewhat conjectural. But they are interesting, as showing, from the experiments which had been made, that large quantities of a valuable product may be obtained at a comparatively cheap rate; and this, from what is now a complete refuse—that is, the stem and leaves; while the expenses of culture are paid for by the fruit. And the more so, as the data are West Indian, where the prices of material and the wages of labour are much higher than in India. Specimens of Plantain fibre, and a barrel of it for experimental purposes, were sent by two Exhibitors from Demerara, also some from Porto Rico (*v.* 'Illust. Cat., p. 982); and it was stated that the fibre might be obtained in very large quantities from the Plantain cultivation of the former colony. It is calculated that upwards of 600lb. weight of fibre might be produced annually from each acre of Plantains, after reaping the fruit crops. It is further stated, that "at present, the stems of the Plantain trees, when cut down, are allowed to rot on the ground. If a remunerative price could be realised for this fibre, a new branch of industry would be opened up to the colonists." India, unfortunately, furnishes no statements showing the rates at which Plantain fibre, tow, and pulp, might be obtained as articles of commerce. Dr. Hunter, of Madras, has done much in showing the various purposes to which this valuable product might be applied; as he sent to the Exhibition of 1851 both the fibre and the tow in a well-cleaned state. The former about four feet in length, and also dyed of several colours, as well as twisted into fine cord and into rope. Some Plantain rope was, moreover, sent in a tarred state. A portion of the tow sent in a state fit for packing and stuffing, and some converted into paper; of the latter, some was almost as thin as silver paper, and some of it seemingly as tough and tenacious as parchment, well fitted for packing paper, as apparently little affected by water. But in England some excellent letter paper has been made from the Plantain fibre. Besides the above, Plantain meal was sent by Professor Key from Madras, and preserved Plantains from Jessore. But dried Plantains seem already established as an article of commerce at Bombay, as we observe them among the exports for the year 1850-51, from thence to Cutch and Guzerat, to the extent of 267 cwt., valued at 1456 rupees. So that the various applications of which Plantain fruit and fibre are susceptible have been already made in India. It remains only to produce them as cheaply as the other products of the country. Dr. Hunter, in his experiments, found that the fibre cost about three annas, or about sixpence, a pound—which is prohibitive as an article of export; but he states that if regular supplies of the fibre were required, the price might be reduced to two annas. He also mentions that, at Madras, the rate at which the stems were at first supplied was ten annas for one hundred trees: but this was raised to four rupees for the same number, when he began to make use of them. This is sufficient proof that they are not very abundant there. But "in the vicinity of some of the Zillah (that is, of District), Jails, the Plantain is cultivated very extensively, but no use is made of the stems, which are allow-to rot on the surface of the ground." This is also the case in most parts of India. On the opposite coast of Arracan, the Plantain is abundant. What seem to be the layers forming the stem of such a plant, and about seven feet in length, are sold there in a dried state, and called *Pa-tha-you Shaw*; some of it even twisted into a bast-rope, is sold for the same sum, that is, for one rupee the maund or for about three shillings per cwt. As the above Shaw or *bast* of an unknown plant is sold at so cheap a rate, as well as the other basts sent from Arracan to the Exhibition of 1851, even after some preparation, there is no reason why Plantain fibre might not be sent cheaply into market; and no doubt that it would very soon command a price equal to its real value, as a material for paper-making, for cordage, or for textile fabrics. The fibre might be collected in situations where the plant is already cultivated, in gardens, or where it grows wild, and its stems not turned to any account. Or it might be cultivated in fields on its own account, either with or without other crops, such as Pan or *Piper Betle*, or Ginger, Turmeric, &c. The fruit in its fresh state, near towns, or in a preserved state, or converted into meal, ought to pay all the expenses of, and afford some profit on the culture. The stems and leaves would thus be obtained at a minimum of cost—that is, simply of carriage. Indeed, if the crushing mill were not of too cumbrous a nature, it might be brought into the vicinity of the field, in the same way that the natives of India construct a sugar-mill and boiler in the immediate vicinity of where the Date tree is grown or the Sugar-cane cultivated. A mill, consisting of the rollers of a sugar-mill or an enlarged churka, with an Archimedean screw, or with cog-wheels, or with bands, to which motion is given by bullocks, as practised in various parts of India, would probably be sufficiently effective, and certainly economical. The separation of the different qualities of fibre, with the washing, combing or heckling, and drying, might at first all be performed by hand, where labour is so cheap. If all the fibrous matter, or the combings or tow only, should be required for conversion into half-stuff for paper-makers, nothing is more effective, and at the same time so economical, as the Dhenkee of India. To this attention has been recently called by Mr. Henley ('Journ. of Soc. of Arts,' vol. ii, p. 486), and which, as he describes, "resembles in principle our European tilt hammer." "Its cost would be—erected in place—engineers, foundations, and all charges included—three shillings; and this charge supposes the more than usually heavy machine employed for paper-making"! "The total wages for the preparation of 20 to 30 lb." of suitable material, "would amount to sevenpence-halfpenny" Mr. Henley adds, that "in the event of employing such fibres as the Plantain leaf stalk, a small pair of hard wood grooved rollers, such as they employ for squeezing sugar-cane, would be very useful. Their cost is two shillings." Dr. Royle having, in a Lecture before the Society of Arts, recommended the Plantain as likely to yield an abundant supply of material for paper-making, Mr. Henley observes: "From extensive cultivation of the Banana or Plantain, which surrounds almost every house, it is probable this material would form one of the first objects of attention by paper-material collectors; but from its coarse, stringy nature, it would be cheaper in the state of fibre than as half-stuff. This plant offers great advantages for our views generally, for it is truly in the position of refuse, inasmuch as it has already paid the charges of its cultivation by its products in fruit. The interior of the plant, or true flower-stem, is eaten as a vegetable by the natives; the lower part being perfectly mild, whilst the upper extremity, near the bunch of fruit, pours out, on cutting it across, a limpid fluid, which is very acrid and deleterious, and is a true substantive olive dye on cotton cloth, as indelible as marking ink, for which it may be substituted." With regard to the price at which such materials could be obtained, Mr. Henley says; "I am of opinion that contracts could be made, according to the ordinary usages of the country, at the rate of from one rupee eight annas, or three shillings, to two rupees eight annas, or five shillings, per maund of 82 lbs., deliverable at any central depot within a radius of twenty miles. These prices are equal to from about £4 4*s.* to £7 a ton; and that of these too, a lowest-priced material could be landed in London, paying all charges, for £13 4*s.*, and the more expensive, which would include articles equal to linen rags, at £16 5*s.*" Having already noticed the facility with which the species of Plantain may be cultivated in suitable climates, Dr. Royle mentions that he lately tasted some excellent fruit of *Musa Cavendishii*, grown in a Fernery on Putney Heath. He warns cultivators against planting the Plantain too close together; for though this may produce fineness of fibre, it will also diminish strength, and want of free ventilation may produce disease. For separating the fibre, it may be a question whether smooth or grooved cylinders will be best for so fleshy and moist a substance, but it is very necessary to remember that the pulp or the fibre must be thoroughly dried, in order that it may not undergo decomposition when in transit in the hold of a ship. Of the value of the Plantain fibre for paper-making, there can, he conceives, be no doubt. Some paper, though unbleached, but excellent as far as substance and tenacity are concerned, was sent from India by Dr. Hunter, in 1851. In the year 1846, Mr. May showed Dr. Royle some beautiful specimens of note and letter paper made from Plantain fibre. He was at that time anxious to establish a manufactory for Plantain paper in Calcutta, but subsequently went to one of the British colonies in South America; and a gentleman showed specimens of paper made from Plantain fibre in Demerara. Mr. Routledge subsequently made some excellent paper, both of a tough and of a fine quality, from the fibres of species of Musa—sheets of which he presented to Dr. Royle, who has lately seen specimens of similar paper in the hands of Mr. Sharp. Besides which, excellent paper has for some time been made from the refuse of or from worn-out Manilla rope. All which facts prove that an excellent material for paper-making may be had in inexhaustible supplies, whenever those chiefly interested choose to take the necessary measures for securing such a supply. As to the other uses to which Plantain fibre can be applied, Lieut. Col. Whinyates, Principal Commissary of Ordnance, in a letter to the Secretary to the Military Board at Madras, states that the Plantain oakum or tow sent by Dr. Hunter is "undoubtedly of a very superior description, and admirably adapted for packing. From the soft, elastic character of the fibre, he also conceives that it would be a desirable substitute for coir in stuffing hospital beddings, &c. But he fears that the supply is too limited, and the cost all too high, being at that time (October 29th, 1850) about three annas the pound." With respect to the strength of Plantain fibre, Dr. Royle states that in some experiments which he had made on Plantain fibre, some from Madras bore a weight of 190 lb., but the specimen from Singapore bore not less than 390 lb., while a salvage of Petersburgh Hemp, of the same length and weight, broke with 160 lb. A twelve-thread rope of Plantain fibre made in India broke with 864 lb., when a similar rope made of Pine apple fibre broke with 924 lb. Even from these experiments, it is evident that Plantain fibre possesses sufficient tenacity to be applicable to many, at least, of the ordinary purposes of cordage, as is very clearly shown by the experiments detailed in the following tabular statement. But it is probable that the plants grown in a moister climate than that of Madras will posess a greater degree of strength. The outer fibres may also be converted into a useful kind of coarse canvass, as has been done by Dr. Hunter; and the more delicate inner fibres most probably into finer fabrics, as is the case with those of the Abaca or *Musa textilis*; when equal care has been taken in the preparation and separation of the fibres, and there is some experience in weaving them.—*Royle, Fib. Plants.*

STATEMENT showing the comparative Strengths of the undermentioned Specimens of Rope, Cord, String, &c., made from the fibres of the Plantain, with Hempen Rope, as exemplified in a set of Experiments carried on at the Arsenal, Fort St. George, in July, 1850.

Number marked on label.	LABELLED.	Arsenal Number.	Description.	Circumference.	Length of Rope, &c., used	Weight required to break the Rope, &c.	Weight required to break: After immersion in water 24 hours, dried in the shade, and tested 7 days after.	Weight required to break: After being immersed in water 10 days, and dried in the sun.	Weight required to break: Manilla Rope of same circumference.	Weight required to break: English Hemp Rope, of same circumference	Weight of one Fathom of each description: Plantain.	Weight of one Fathom of each description: Manilla.	Weight of one Fathom of each description: Europe.
				In	Fams.	lb.	lb.	lb.	lb.	lb.	oz.	oz.	oz.
1	Rope and String made from the fibres of the Plantain. Mr. Lama. Porto Novo.	1	Line	0¾	2	248	—	—	—	—	2 1-16	—	—
		2	String	0¼	1	54½	—	—	—	—	0 4-16	—	—
2	Rope and Line made from the fibres of the Plantain, by the prisoners of the House of Correction.	3	Line	1	2	288	—	—	—	—	2 7-16	—	—
		4	ditto	0¾	2	190	—	—	—	—	1 12-16	—	—
		5	String	0½	1	114	—	—	Bengal log line 137	—	0 9-16	—	—
3	Rope made from the fibres of the Plantain, in the House of Industry. Fibres prepared in the House of Corr., Madras.	6	Rope	3¼	2	2330	2387	2050	4669	3885	19 9-16	28 11-16	39
		7	ditto	1½	2	638	—	—	869	—	6	5	—
		8	ditto	1½	2	694	—	—	869	—	5 13-16	5	—
		9	ditto	1⅜	2	624	—	—	—	Ratli 8	4 5-16	—	5 1-16
4	Rope made from the fibres of the Plantain, by a pauper in the Monegar Choultry, Madras.	10	Line	1	1¾	323	—	—	—	—	2 10-16	—	—
		11	ditto	1	1	330	—	—	—	—	3	—	—
		12	ditto	0¾	2	183	—	—	—	—	1 8-16	—	—
		13	ditto	0¾	0¾	362	—	—	—	—	1 9-16	—	—
5	Rope and String made from the fibres of the Plantain, by five Europeans, in her Majesty's Jail.	14	Rope	1¾	2	1240	1266	762	1490	1184	7 9-16	9 8-16	13
		15	ditto	1⅜	2	974	—	—	Bengal logline 137	—	5 8-16	—	—
		16	String	0½	1	185	—	—		—	1 4-16	—	—
		17	ditto	0¼	1	38	—	—	—	—	0 5-32	—	—
6	Ditto, ditto, by the same prisoners, from fibres of the Plantain prepared in the House of Correction.	18	Rope	2	2	1490	—	—	—	—	11	—	—
		19	ditto	1¾	2	1322	—	—	1490	1184	8 6-16	9½	13
		20	ditto	1¼	2	806	—	—	757	at 638	5	3¼	5 1-16
		21	String	0¼	1	43½	—	—	—	—	0 3-16	—	—

(5501) MUSA SAPIENTUM. Musaceæ.

The Plantain.

Kilah, Duk. | Vallee-kai, Tal.

There are several varieties of the Banana cultivated in the Deccan,—the large red, the green, and the yellow. A small sort, which is supposed to be the real Banana of the West Indies, is perhaps the most luxuriant of the whole. The plants blossom at all seasons, and as soon as the drupe of fruit begins to ripen, which is known by some turning color, it is cut and hung up to ripen in the house. The plant will not bear again, and may be cut down (otherwise it will perish of itself,) when the surrounding shoots grow up and blossom as the former. The plants are generally grown in beds or clusters in a good rich soil, when fine fruit is almost the sure return. In transplanting the shoots, if two or three feet high, about one half is generally cut off ofthe common plantain the green fruit is used in curries; the natives use the extremities of the flower shoots, the heart of the stem, and that portion of it from which the roots proceed in their curries. This and the variety Musa Paradisiaca Banana, Valey is cultivated everywhere in Southern India. It yields a fine white silky fibre of considerable length, specifically lighter than Hemp, Flax and Aloe fibre by 1-4th or 1-5th and possessing considerable strength. There are numerous varieties of the Plantain, which yield fibres of different qualities, viz:

Rustaley, superior table plantain.
Poovaley, or small Guindy variety.
Payvaley, a pale ash colored sweet fruit.
Monden, 3 sided coarse fruit.
Shevaley, large red fruit.
Putchay Laden or long curved green fruit.

These varieties, as might be expected, yield fibres of very different quality. The only samples in which the different plants are noted, were those contributed by the South Arcot Local Committee, but they are not well cleaned. Very fine specimens of this fibre were contributed by the Local Committees of Masulipatam, Tanjore, Malabar, Canara, Nellore and Travancore. Very carefully prepared Plantain fibre, Hackled Do yarn, string, rope, tow and half stuff for paper were exhibited by the Madras School of Industrial Arts. The same fibre was exhibited from almost every district in the Presidency, and varies in shade and quality according to the method of cleaning that has been adopted. This plant has a particular tendency to rot and to become stiff, brittle and discoloured by steeping in the green state, and it has been ascertained by trial that the strength is in proportions to the cleanness of the fibre. If it has been well cleaned, and all the sap quickly removed, it bears immersion in water as well as most other fibres, and is about the same strength as Russian Hemp. The coarse large fruited plantains yield the strongest and thickest fibres, the smaller kinds yield fine fibres, suited for weaving, and if carefully prepared, these have a glossy appearance like silk. This gloss however can only be got by cleaning rapidly, and before the sap has time to stain the fibre, it is soon lost if the plant be steeped in water. By far the greater number of specimens of Plantain fibre exhibited were discolored from steeping, and they had acquired a dull ash grey or brown color, which in this plant is always accompanied by stiffness and brittleness; one or two of the specimens are so brittle as to break when gently rubbed; others are harsh and stiff. Some well made rope, line, and string were exhibited by several of the Local Committees. A 2d Class Medal was awarded for the ropes from Mayaveram in Tanjore, these were clean, strong, silky and well laid up. A 2nd Class Medal was awarded to Mr. Thorpe for the cleanest and largest bundles of Plantain fibre, prepared in the Monegar Choultry. The Madura Local Committee exhibited fine specimens of fibre cleaned both by the quick process and by soaking, the latter have lost their gloss and are stiff and not so strong as the others. The Travancore Local Committee exhibits some excellent fibre and rope, the latter very carefully laid up but stiff from over twisting. This kind of rope ought not to be hard spun, as it becomes stiffer when wet and is liable to snap if it gets into a twist or knot, The Plantain fibre being one of the most abundant in India, has received this lengthened notice.—*M. E. J. R.*

(5502) MUSA TEXTILIS. Manilla Hemp. Among the various substitutes for hemp, few have hitherto attracted more attention than Manilla Hemp, and this as well from the elegance of its appearance, combined with the power of bearing great strains, as from being very durable, lighter, and also cheaper than Russian hemp. It has of late years been much employed for cordage of various kinds, especially where considerable strain is required, as in ropes for raising goods into warehouses or out of mines. Some yachts, as well as many American vessels, have the whole of their rigging composed of Manilla Hemp, and this cordage, when worn out, can be converted into an excellent quality of paper. The plant yielding this fibre in Eastern Asia, is extremely interesting, not only because it may easily be cultivated but because there are other species of the same genus which may be turned to the same useful account. The plant which yields Manilla Hemp is called *Abaca.* The natives distinguish several varieties of the Abaca.

1. *Abaca brava* (the wild Abaca), called *Agotai* by the Bicoles.
2. Mountain Abaca, the fibres of which only serve for making ropes, that are called *Agotog* and *Amoquid* in the Bicol language.
3. The *Sagig* of the Bisayas.
4. The *Laquis* of the Bisayas, by whom the fibres of the original Abaca are called Lamot.

Rumphius states that the Malay name is *Pissang utan*; that it is called in Amboyna, *Kala abbal*; in Ternate, *Fana*; and in Mindanao, *Coffo*, as also the cloth made from it. He distinguishes the Mindanao kind from that of Amboyna. by the natives of the Philippine Islands, who are said to apply the same name to its fibre. The plant is sometimes called a tree, but it is, in fact, only a large herbaceous plant, which belongs to the same genus, and is, in fact, a kind of plantain or banana, which is named *Musa textilis* by botanists. It was first called *Musa sylvestris* by Rumphius in his 'Herbarium Amboinense.' It was thought to be a variety of *M. trogloditarum* by Blanco, but called *Musa textilis* by Don Luis Nee, in a memoir which has been translated into English, and published in the 'Annals of Botany,' vol. i; where there may also be seen another memoir, which was sent in French to Sir Joseph Banks. These have been republished in the 'Transactions of the Agric. Soc. of India,' vol. viii, p. 7, together with a translation by Mr. Piddington, of Calcutta, of a notice by Father Blanco, in his 'Flora de las Filipinas.' In addition to these we have a notice in the first volume of the Trans. of the above Society, 1828, by Mr. Piddington himself, one of the gentlemen who escaped the massacre of the English at Amboyna. From these authors we learn that the Abaca is abundant in the volcanic region of the Philippine Islands, from Luzon, in the northern province of Camarines especially, to Mindanao; also in the neighbouring islands, even as far south as the Molucca Islands, that is, in Gilolo. Hence this species may be stated to extend from the Equator to nearly 20° of north latitude. It may, therefore, very probably be easily cultivated in other countries, where there is some similarity of soil, and warmth with moisture of climate; as in India in the province of Travancore, and on the Malabar coast, also in that of Arracan, in Chittagong. Assam, in parts of Bengal, and in the northern Circars. This was one of the plants subjected to experiment by Dr. Roxburgh, in the beginning of the century. His specimens are still in the East India House. Mr. Leycester, one of the founders of the Agricultural Society of India, called the attention of its members to its fibres as early as the year 1822, when he presented the fibres of three species of Musa. These were *Musa sapientum*, *M. ornata*, and the present species, *M. textilis*. That of the latter he describes as having been formed from a coat stripped off about sunrise on that day, and having been brought into the house about ten o'clock, had received no further bleaching from the sun or in any other way; and that he had had some of it made into a neat cord, which was in no way inferior to English whipcord. He concludes his letter by congratulating the members on the fibre of their common overgrown plantains being sufficient for all the purposes of twine requires in their gardens. Some time after this was written we find it stated in the 'Proceedings of the Agricultural Committee of the Society,' 1st October, 1836, that "a row of the Musa plant, from which the China grass cloth is made, is in a flourishing condition." But, on 12th August, 1840, the Committee notice the favourable appearance of some plants of the Manilla' hemp-tree (the abaca or *Musa textilis*.) *Musa textilis* is the *Abaca* of the natives of the Philippine Islands. It is found both in a wild and cultivated state, but the natural groves are considered as property. The fruit is green and hard, and of a disagreeable taste. Several villages formerly furnished yearly 1500 arobas each of the fibre, and others exported nearly as much cordage. With the produce of this plant, the natives of these villages pay their tribute, parish dues, purchase the necessaries of life, and clothe themselves. The Abaca is cut when about one year and a half old, just before its flowering or fructification is likely to appear, as afterwards the fibres are said to be weaker. If cut earlier, the fibres are said to be shorter and finer. It is cut near its roots and the leaves cut off just below their expansion. It is then slit open longitudinally, and the central peduncle separated from the sheathing layers of fibres, which are in fact the petioles of the leaves. Of these layers the outer are harder and stronger, and form the kind of fibre called *bandala*, which is employed in the fabrication of cordage. The inner layers consist of finer fibres, and yield what is called *lupis*, and used for weaving the *nipis* and other more delicate fabrics; while the intermediate layers are converted into what is called *tupoz*, of which are made webcloths and gauzes, four yards long, o different degrees of fineness. These are universall used as clothing. Some being so fine, that a garment may be enclosed in the hollow of the han Besides Pina fibre, fibres of "Jussi" and striped Jussi dresses were sent from Manilla to the Exhibition of 1851, and "Bijuco" fibre is mentioned. The plants yielding these fibres are not known Mr. Bennett says, at Manilla there is an extensive manufacture of muslin and sinamaya o grass-cloth; as if, like in the notice at Calcutta the Abaca was supposed to yield China grass The stem-like mass consists of cellular tissue an fibres, with much thickish, watery fluid, whic requires to be pressed out. The fibrous coat when stripped off, are left for a day in the shad to dry, and are then divided lengthwise int strips, three inches wide. Blanco says th petioles are stripped off one by one, and a incision is made across inside with a knif to take off the bark which covers them. The are then scraped with an instrument mad of bamboo, until only the fibres remain. Som times they require much pressing while b ing scraped. Blanco says the strips are placed beneath the cutting edge of a knife fixed in a long bamboo, which acts as a spring; and the Abaca being placed beneath the knife, is drawn through strongly by one end This must act as a scraper, but much of the Abaca is said to be spoiled. When sufficiently scraped, the bundle of fibres may be shaken into separate threads; sometimes they are washed, and then dried and picked—the finest being separated by the women with great dexterity. Those for cordage require no further preparation. Those for fine weaving are rendered soft and pliable by beating them with a wooden mallet, after having been made up into a bundle. They are then fastened to each other by "almost invisible knots"—but rather, have their ends gummed together, as in the case of the Pine-apple fibre—then wound into balls, and afterwards committed to the loom. Don Luis Nee describes the Abaca as being dressed like flax on a kind of heckle—a sort of saw which operates like the heckle (Blanco). Mr. Piddington describes it as a bamboo scraper, into the slit of which the Abaca is introduced, and which being dragged downwards, acts as a scraper on both sides. The stuffs, when woven, are soaked in warm water (lime-water, Blanco) for twenty-four hours, after which they are soaked in cold water, then put into rice water, and, lastly, washed as before—by which means they acquire lustre, softness, and a white colour. Some are also dyed, and take different colours (as blue and red). Others are embroidered. Few are imported into Europe, but seem often to be confounded with grass-cloth. These details have been given in order that the proper treatment may be followed if the plant is cultivated in India; or some of them may be applied to the other kinds of Musa cultivated in India—the fibres of some of which may have a portion of the properties of the Manilla Hemp as cordage. Mr. Piddington had no doubt that when the Manilla Hemp was better known, it would be more appreciated, especially if properly manufactured: the great defect of Manilla-made rope being its stiffness in rainy weather, arising from the coarseness of the yarns—not more than three being to a strand, which should have nine or twelve. This, Mr. Piddington had ascertained in a vessel commanded by himself, in which both kinds were used: and the latter (made by himself) was at all times as pliant as hemp. It bears tarring well, and he had known it used for lower rigging with success. In a subsequent volume of the 'Transactions,' in the year 1840, Mr. Stewart Mackenzie, then Governor of Ceylon, forwarded to the Agricultural Society of India. a specimen of Manilla rope, with a note from Mr. Higgs, Master-Attendant at Trincomalee. In this the latter observes, "that shortly after the arrival of the Melville in this country, in 1832, Sir John Gore procured rather a large supply of the different sizes (of Manilla rope) for the squadron, from seven inches to one inch. In that ship we made extensive use of it, reeving it on one side of the ship against Europe rope on the opposite side, and it is from a close observation of its merits, that I have formed the opinion of its being very superior to Europe rope in this country, particularly if this has been long in store here." Mr. Higgs regrets that the Manilla rope is not better laid; and observes that Capt. Naish, one of the oldest captains in the China trade, was in the habit of bringing the large rope from Manilla, and laying it up afresh at Bombay, and tarring the yarns; when it became excellent rope for shrouds. The price of Europe rope at the Naval Yard at Trincomalee, was then £2 7s. 3d. per cwt, while the price of the Manilla rope (without freight) was £1 12*s*., and it was one fifth lighter than Europe rope.—*Royle, p.* 69. Having seen the rate at which such materials may be imported, both from the East and the West Indies, it is desirable to have some idea of the prices which are likely to be realised for Plantain fibre or pulp, when introduced into the markets of Europe. Manilla Hemp, which has long been in demand both in America and in Europe, had a nett average price, for the ten years previous to 1852, £32 per ton. In part of the years 1844 and 1845, it sank as low as £22 to £25; and the consumption increased so much, that the price rose, in 1852, to £44 and £50 for the average kinds; but, independently of what was used for cordage and coarse purposes, there was a considerable consumption of the fine, white qualities, for which horse-hair had originally been used. In the rise which took place in April, 1854, Manilla Hemp was quoted at from 70*s*. to 76*s*. per cwt. Though common Plantain fibre is not possessed of the strength of Manilla Hemp, yet it is fitted for many of the ordinary purposes of cordage and canvass, and some of the fine kinds for textile fabrics of fine quality and lustre. In the communication from Demerara, already quoted, it is stated that "in 1846, a gentleman (probably Mr. May) visited this colony, and exhibited several specimens of cloth of a beautiful silky texture, and specimens of paper of superior quality, manufactured from the fibre of Plantains grown in the Jardin des Plantes." There is no doubt that some of the more delicate fibres of the interior might be used for such purposes; and for these, a high price would no doubt, be realised; and for the coarser, outer fibres, which are fit for cordage, at least £30, some say £35, a ton; while some of the superior tow would be a good substitute for horse-hair, for stuffing beds, &c.; and the different qualities of half-stuff producible from the combings, &c., of different parts of the plant, would produce half-stuff, at least equal in value to the rags which sell in ordinary times from 16s. to 20s. a cwt. But when its qualities are better known, it probably would sell at still higher rates, as there would be no labour in sorting, and no loss of material in claiming, Mr. Betts was induced in India, to attempt the preparation of the fibre, from seeing a remark in the 'London Price Current,' of Dec., 1839, that considerable supplies of a new sort of Hemp from the stalk of the Plantain tree had realised from 6*d.* to 8*d.* per lb.; and the Society of Arts were induced, as long since as the year 1762, from the apparent importance of the subject, to offer a premium for the production of this fibre (*v.* 'Jury Report,' p. 102). Therefore, even with the least sanguine expectations, and on the most moderate computations, there is every prospect of a certainty of demand, accompanied by remunerative prices. With this in view, we may conclude our observations on this subject, which may appear to occupy too much space, and to have been treated of too much in detail. But if properly considered, it cannot but appear of vast importance to the natives of tropical countries, and to planters and colonists abroad, to utilise so valuable and abundant a product, which is now allowed to run to waste, and of which, if they increase the cultivation, they will at once attain the two-fold object of multiplying the supply of food for the body, at the same time that they are increasing materials for diffusing information for the mind.—*Royle, Fib. Plants.* Musa textilis grows freely in Singapore.—*Royle Fib. p.* 377. This species of banana, is a native of the Philippine and of some of the more northerly of the Molucca Islands. On account of its filaments it is extensively cultivated in the first of these, particularly in the provinces of Camarines, and Albay in the great island of Luzon, and in several of the Bisaya Islands, a range lying south and east of it. The name abaca belongs to the Tagala and Bisaya tongues, but is not the generic name of the banana in either of them. By the Spaniards of the Philippines the plant is known under the name of arbol de canamo, or the hemp tree, from which no doubt, is derived our own commercial one for the filament "Manilla hemp." The abaca, like other bananas, is propagated easily by the suckers which spring up at the roots of the old plant when it dies. A measure of 5000 square yards of land will grow 1000 abaca plants. It grows to the height of 13 or 14 feet exclusive of the leaves. The fruit is small, of a disagreeble taste, and not edible. When it is about to form, the plant is cut down, and the stem being cut open longitudinally, is found to contain a great quantity of filaments of various thickness, and usually a couple of yards in length. These are extracted, hackled after the manner of flax, and then sorted. Some of the finest are as slender as a hair of the head, and these are reserved for the manufacture of cloth, while the coarser are appropiated for cordage from the smallest rope to a ship's cable. In the husbandry of the Philippines, the abaca is of more importance than cotton. When or how its culture came to be first introduced is not known. In his enumeration of the plants of the Philippines on their first discovery in 1521, Pigafetta does not include the abaca, although he mentions cotton and the esculent banana; but it is possible enough that so peculiar a production may have escaped his notice. Dampier, in his account of Mindano, where he resided for six months in 1686, not only mentions the textile banana, but gives an ample and accurate description of the mode of extracting the thread from the trunk. "As the fruit of this tree," says he, "is of great use for food, so is the body no less serviceable to make cloths, but this I never knew till I came to this island. The ordinary people of Mindano do wear no other cloth." After this follows the account of the process of extracting the fibres, which is well worth perusal. The Dutch have of late years introduced the culture of the abaca into the northern or volcanic peninsula of Celebes, where it seems to be indigenous, and with a fair prospect of success. There is a large exportation of abaca in the forms of raw hemp and cloth, but especially of cordage, from Manilla.—*Crawfurd, Dil. p.* 1.

(5503) MUSCARDINE, the name given to a disease to which silk-worms are subject, and which often causes great injury to those who cultivate these animals for the sake of their silk. This disease is attended with the development of a fungus belonging to the genus *Botrytis*, and has been named by Balsamo and Montagne *B. Bassiana.* This plant, which is characteristic of the disease, can be propagated by the introduction of spores into a healthy caterpillar. The result of the changes produced upon the blood and tissues of the animal is its death. This disease is much more common some years than others. It frequently spreads to other insects; and the caterpillars of other *Lepidotera* can be inoculated by the spores of the *Botrytis.* When once the disease has appeared there seems to be no means of checking it. The best mode of prevention is to take care that the caterpilllars are not over-crowded, and that they have a sufficient supply of fresh food. The predisposition to this disease amongst silk-worms seems to be brought on by the same causes as those which act upon the human system, an render it favourable to the attacks of epidemi diseases. (Robin, *Hist. des Vegetaux Parasites.*

(5504) MUSCICAPIDÆ, *Flycatchers*, a fa mily of insectivorous Birds, so named from thei mode of taking their prey. Thus, M. Temminc states that the Flycatchers (Gobe-Mouches; fee entirely on flies and other winged insects, whic they catch as they fly ('Manuel d'Ornithologie' and our countryman White says:—"There i one circumstance characteristic of this bird (th

Spotted Flycatcher, *Muscicapa grisola*) which seems to have escaped observation, and that is it takes its stand on the top of some stake or post whence it springs forth on its prey, catching a fly in the air, and hardly ever touching the ground, but returning still on the same stand for many times together." ('Nat. Hist. of Selborne.')

Eurylaimus.—Bill broader than the head; under mandible very thin, particularly at the base. Nostrils basal, transverse, oval; the aperture naked. First quill slihgtly second almost imperceptibly graduated. Tail short, rounded. *E. Javanicus* (*E. Horsfieldii*, Temm). Entire length eight inches. Head, sides of the neck, and the whole of the neck and body underneath violet, or rather vinous, varying in intensity. The part of the forehead around the bill nearly black. Upper part of the neck brown, darker towards the back, where the tint is sooty. Wings very deep blackish-brown above, more intense near the shoulder, and lighter towards the extremity. A yellow streak between the coverts and secondary quills. Wings beneath from the axillæ to the shoulder yellow, which borders the wing externally. Tail-coverts black at the base and yellow at the tips, so that the rump appears yellow, which is the colour at the vent. Two intermediate tail-feathers black, four next on each side black, with a white transverse band near the extremity. On the two external feathers the band is near the middle, and rather broader. Bill reddish-brown at the base, with both mandibles irregularly variegated, and striped towards the extremity; culmen yellowish; cutting-edges intensely black and shining. Tarsi and toes dusk-yellowish; claws brown, inclining to black. Dr. Horsfield is of opinion that from the observations of Sir Stamford Raffles, in the catalogue of a zoological collection made in the island of Sumatra under his direction, and communicated to the Linnæan Society, we can also in some measure determine the range of this genus: "It extends," continues the Doctor, "from Sumatra eastward to Singapura, and thence south to the eastern extremity of Java near the Straits of Baly, where I discovered it in the year 1806; since that period I have not met with it again. We are indebted to Sir Stamford Raffles for the following remarks on the first species.—'It frequents the banks of rivers and lakes, feeding on insects and worms. It builds its nest pendent from the branch of a tree or bush which overhangs the water.' I found it in Java, in one of the most distant and inaccessible parts covered with extensive forests and abounding with rivers and marshes." Dr. Horsfield placed the genus among the *Meropidæ* or *Syndyctylæ.*—*Eng. Cyc.*

(5504) MUSHROOM. [AGARIDUS; FUNGI.]

(5505) MUSHROOM.

Koodruttee, HIND.

Commonly found all over the country during and after the rains.—*Riddell.* A tribe of fungus plants (*Agaricus*), some species of which are used for pickling, in making catsup, and for using fresh. Many kinds are poisonous, and it is only by experience that the edible varieties can be distinguished.—*Faulkner.* Mushrooms are often seen in the Tenasserim bazar, and the Karens have names for sixty-four different species of mushrooms and the allied fungi. They distinguish the edible from the poisonous kinds, they say, by touching them with the lime that they eat with the betel. If the fungus turn red when touched, it is regarded as poisonous. But they are so careless or ignorant, that sickness and death often ensue after eating them.—*Mason.*

(5506) MUSICAL INSTRUMENTS, both European and Native, form an article of import and of internal traffic. The principal instruments of the Mahomedans are the Sectar: Moorchung; Duff; Tuckree: Poonggee; Meerdung Munjeera: Ghuggree; Ghoongroo; Sarung D'hol; Soor; Shuhnall; Banka; Qurna; Tooree or Toortooree: Sunkh; Nugara; Dunka;: D'hubboos: Tukkoray or Zer Bum: Khunjooree Daeera; Dubla Puk' hawuj; Tasa; Murfa, Been or Vina, Keenggree; Doroo; Munjeera Ghoongroo. The Hindoos, in addition to the above, have the Tumboorah: Kinnarah: Juck-kee, Ghatum, Khunjeree Senkum Gyreekaulah, Pillungovee Theeroo-chenum; nlgojah, Pawinoolah naga-sarum Bhooree Naga-saurum Dhamawyee Muddal Sooreyah Vawyedium Tittee Doloo Commoo Tuppettah Toodoomoo Bhairie; Toora-ka-naga saramooloo, Aurabee Toorak Dummawyee, Brumah Taulum, Dhasaree Tapettah Undhaoodooca Chetecaloo, Booragah Talm.

(5507) MUSK.

Miskh, Muskh, ARAB.
Rutta, Ooroola, CYNG.
Desmer, DAN.
Muskus, DUT.
Musc, FR.
Bisam, GER.
Kustooree, GUZ. HIND.
Muschio, IT.
Dedes, JAV.
Moschus, LAT.
Jebat, MAL.
Miskh, Muskh, PERS.
Almiscar, PORT.
Kabarga, Muscus. RUS.
Mooshka, Castoorie, SANS.
Almizcle, SP.
Custoori, SANS. TAM, TEL.

Humor in folliculo præputii secretus, *London* Concretum Moschus dictum, *Dublin.* Inspissated secretion in the follicles of the prepuce, *Edinburgh*, of MOSCHUS MOSCHIFERUS, Linn. Musk. The Musk animal differs from common Ruminants in the absence of horns, and in having long canine teeth on each side of the upper jaw. It inhabits the mountainous regions of central Asia, extending from the Himalayas to the Altai mountains, and from these to China. Hence, as in the case of Rhubarb from the same regions, we have Russian, China, and Indian Musk. It is singular that the common Hindoo name of the Musk, and in the Himalayas that of the Musk animal, is *kustooree*, a name similar to Castoreum a substance which Musk so closely resembles in nature. The name *musk* is no doubt derived from the Arabic *mishk* or *mooshk*, which is evidently the same word as the Sanscrit *mooshk*. This has been used as a perfume and as a medicine by Hindoos from very early times. It seems to have been adopted from Serapion, but it was previously mentioned by Ætius. The animal bears a close resemblance to the Deer tribe in shape and size. It is usually less than three feet in length, with the haunches somewhat more elevated than the shoulders. The want of horns and the projecting canines have already been mentioned. There are altogether 32 teeth : namely, 8 incisors in the lower jaw, 2 canines in the upper, and 24 molars. The canines are not met with in the female. The ears are long and narrow, and the tail very short. The fleece, which consists of strong, elastic, undulated hairs, varies in colour with the season, the age of the animal, and perhaps the place which it inhabits. The general colour is a deep iron-grey. The individual hairs are whitish near the root, and fawn-coloured or blackish towards the tip. The gestation of the female was quite unknown until Mr. Hodgson in Nepal ascertained that it was about 170 days. They are extremely timid, mild, and gentle in their nature. Found on the tops of difficultly-accessible and generally open mountains, usually in the neighbourhood of the snow, but coming nearer to the plains according to the inclemency of the seasons, springing from rock to rock with great agility. The Musk animal is particularly distinguished by the males secreting the remarkably strong smelling secretion called Musk, in a planoconvex oval, hairy bag, of which the orifice is situated just before the preputial orifice. The sac is flat, smooth, and naked above where it is applied, against the abdomen, convex, below, and hairy, composed of several coats. The musk is secreted by small gland-like bodies situated in little pits on the most internal of these coats. The quantity in each sac varies from 1½ to 3 drachms It is most abundant in the rutting season and when fresh is soft, and of a reddish brown colour When dried, and contained in its native sacs, i forms the Musk of commerce. The kinds known are the Chinese and Siberian ; the last is inferior in its fragrance to the other. The Chinese is probably from the same kind of cold and lofty region as the Himalayan. Some of this is imported into and apparently consumed in *India Royle* Musk. is in grains or lumps, soft and unctuous to the touch, of a reddish-brown colour, with a powerful, penetrating, and diffusive smell. It is usually adduced as an instance of the subtlety of the particles of matter. The taste is bitter, disagreeable, and somewhat acrid ; readily inflammable. Rectified Spirit and ether are the best solvents of Musk. Analysed by different chemists, it has been found to contain a variety of principles, as Stearine, Elaine, Cholesterine, an Oily Acid combined with Ammonia, free Ammonia, various salts, and animal principles, as Albumen, &c., an odoriferous principle which seems particularly attached to the Ammonia. But the quantity and proportion of the constituents vary considerably, perhaps from the difficulty of obtaining specimens which have not been subjected either to abstractions or to additions. The hunters even are said to adulterate it, and if they do not the Chinese merchants do so. —*Royle.* Musk, then, is the unctuous secretion of a glandular pouch or sac,, situated in the skin of the abdomen of the musk-deer (*Moschus moschiferus*), an inhabitant of the great mountain range which belts the north of India and branches out into Sibeiria, Thibet and China. It is also found in the Altaic range near Lake Baikal, and in some other mountain ranges, but always on the borders of the line of perpetual snow. It is from the male only musk is produced and the secretion when dry is of a dark brown or black colour, and somewhat granular. Its taste is bitter, and its peculiar and penetrating odour is well known. It was formerly held in high repute as a medicine, and it is still so among eastern nations. The musk-deer is eagerly hunted for the sake of its costly perfume, which, however, is always much adulterated. Tavernier says that the odour of musk, when recent, is so powerful as to cause the blood to gush from the nose, and in this way he would account for the supposed adulteration of the article with dried blood. Chardin also says, "It is commonly believed that when the musk-sac is cut from the animal, so powerful is the odour it exhales, that the hunter is obliged to have his mouth and nose stopped with folds of linen, and that often in spite of this precaution the pungency of the odour is such as to produce so violent an hæmorrhage as to end in death. I have heard the same thing talked of by some Armenians who had been to Bootan, and I think it is true. The odour is so powerful in the East Indies that I could never support it ; and when I trafficked for musk, I always kept in the open air, with a handkerchief over my face, and at a distance from those who handled the sacs, referring them to my broker : and hence I knew by experience that this musk is very apt to give headaches, and is altogether insupportable when quite recent. I may add that no drug is so easily adulterated or more apt to be so." Tavernier states that at Patna he once bought 1,673 musk bags weighing 2,557½ ounces, containing 452 ounces of pure musk.—*Tomlinson.* Two musk-deer, called "kosturah" by the mountaineers were seen by Dr. Hooker in East-Nepaul. The musk, which hangs in a pouch near the navel of the male, is a well-known object of traffic in Bengal. This creature ranges between 8000 and 13,000 feet, on the Himalaya, often scenting the air for many hundred yards. It is a pretty grey animal, the size of a roebuck, and something resembling it, with coarse fur, short horns, and two projecting teeth from the upper jaw, said to be used in rooting up the aromatic herbs from which the Bhoteeas believe that it derives the odour of musk. This he much doubted because the animal never frequents those very lofty regions where the herbs supposed to provide the scent are found, nor had he ever seen signs of any having been so rooted up. The *Delphinium glaciale* smells strongly and disagreeably of musk, but it is one of the most alpine plants in the world, growing at an elevation of 17,000 feet far above the limits of the kosturah. The female and young male are very good eating, much better than any Indian venison he ever tasted, being sweet and tender. Mr. Hodgson once kept a female alive, but it was very wild, and continued so as long as Dr Hooker knew it. Two of his Lepchas gave chase to these animals, and fired many arrows in vain after them: these people are fond of carrying a bow, but are very poor shots.—*Hooker Him. Jour.* vol. 1. p. 269. This substance is an extremely odorous secretion, lodged in a bag which is attached and peculiar to the abdomen of the male Musk-Deer (*Moschus Moschiferus.*) The elevated regions frequented by the creature, its timidity, and speed in flight, render it very difficult to obtain the substance, while the high price borne by it offers great inducements to substitute other articles for that which is genuine. The musk-bag varies much in form, colour, size, and quality, circumstances which suggest the belief that it is procured either from two or more species of musk-animals, or that it has been obtained at different periods of the year, or from very differently-aged animals. In the very young animal the bag is quite empty, while in the old and feeble the musk is in small quantity and of inferior strength. It is said to be secreted in greatest abundance during the rutting season, and to have then its sensible qualities most developed. The secretion has a much stronger odour in the animal which inhabits Tibet and China than in that which frequents the more northern districts of Siberia. In the fresh state the musk has an extract like consistence and a reddish brown colour, with are odour so powerful that the huntsmen can scarcely endure it. This odour diminishes by drying, and the musk acquires a friable granular state, and a dark brownish colour. In Siberia the chase occurs in spring and summer. In Tibet the pursuit is restricted by the government to certain periods, and the bags which are obtained are stamped with the royal signet. In commerce two and occasionally three varieties of Musk are met with. The Tonquin, or Tibet Musk, occurs in small oblong rectangular boxes, lined with lead, and covered with paper or silk. Each bag, or pod, as it is termed, is wrapped in thin lube or red paper on which are marked some Chinese characters. Sometimes the bags are enveloped in a deep yellow brownish nearly transparent paper, which becomes brittle by time. The most distinctive mark of this sort of musk is, that it is slightly flattened, nearly round, and very rarely pear-shaped. The yellow or yellowish-brown hairs chiefly at the sides, are often cut, while those which remain in the centre are darker coloured, finer, and less bristly. Generally the hairs converge or point towards a small natural opening. The pods are mostly about two inches and a half long and one inch and three-quarters broad. The weight of different specimens varies considerably, some being merely 3 drachms 30 grains, others 9 drachms 47½ grains; the average is 6 drachms 12 grains. The average quantity of musk contained in the sacks is about 2½ drachms. By careful removal of the bag there remains the musk, which is solid, in grains of different sizes, adhering to each other, soft and unctuous to the feel, of a reddish-brown colour, like a clot of blood dried, having frequently a number of hairs intermixed, derived from the inner side of the orifice already described. The taste is bitterish, acrid, disagreeable, and somewhat astringent. The odour is strong, peculiar (musky), penetrating, very lasting, and extraordinarily diffusible. It is stated that a single grain can constantly fill the air of a larger apartment with a sensible impregnation for many years, without its weight being perceptibly diminished; and one part can communicate its odour to 3000 parts of an inodorous powder. It should be kept in glass-bottles, very closely stopped, and preserved in a place neither very dry nor too damp. By the analysis of Geizar and Reinan it appears to consist of—1, a peculiar volatile principle (which can exist in a free state); 2, ammonia; 3, a peculiar fixed uncrystallisable acid (these three are in undeterminable quantity); 4, stearine and oleine; 5, cholesterine; 6, a peculiar bitter resin; 7, osmazome, with several salts; 8, a mouldy like substance, in part combined wih ammonia, and numerous salts; 9, sand; 10, water, acid, &c., with some volatile odorous matter. It has not been ascertained upon what musk depends for its peculiar properties. It has been conjectured that a kind of putrefaction goes on which evolves the peculiar odour. Moisture seems to favour this, and musk which when dry yields little scent, becomes powerful when moistened. The odour is augmented by adding a few drops of the solution of subcarbonate of potass.

2. Kabardin, Russian or Siberian Musk, is either received through St. Petersburg, or, it is said, sent to China, and laid, for some time among the bags of genuine Tonquin Musk, to acquire the odour of the latter and then shipped to Europe. The pods of this sort are in general larger, more oval, more compressed, and the

margins often have large portions of the skin of the abdomen attached to them. The colour of the hairs is a dirty milk-white. The musk exhibits a more homogeneous and less granular appearance, having a much fainter odour and taste than the preceding kind. The odour is augmented by moisture, but is somewhat nauseous and disagreeable. The wood cuts show the difference of aspect of the two kinds. Musk is more soluble in water than in alcohol. Of 100 parts of genuine Tonquin Musk, boiling-water dissolves 90 parts, alcohol only 50. Of Kabardin Musk water dissolves only 50 per cent. It is likewise soluble in ether, acetic acid, and yolk of egg.

3. A very small kind of pod is sometimes met with, which is not flattened, but perfectly round: the hairs of a yellowish brown colour. This is probably the musk-bag of the *Moschus Altaicus*. It is safest to purchase the musk out of the pod, as there is then less opportunity of adulteration. Infusion of genuine musk is not precipitated by a solution of bichloride of mercury (corrosive sublimate); but genuine musk is precipitated by nitric and other strong acids, by acetate of lead (sugar-of-lead), and infusion of galls. The musk-bags are used by perfumers to prepare Essence of Musk. An artificial musk is sometimes made with nitric acid and oil of amber.—*Eng. Cyc.*

(5508) MUSK OKRO, MUSK HIBISCUS MUSK PLANT ABELMOSCHUS MOSCHATUS.

Hubb-ul musk, ARAB.
Kapu Kinaissa, CYNG.
Kala-Kustoorie, GUZ, HIND.
Cattu Gasturi, MAL.

The seeds of the (*Hibiscus Abelmoschus*), a native of the East Indies and South America. They are brown, kidney-shaped, the size of hemp seed, slightly compressed, striated, with parallel streaks, and covered with points slightly hollowed. In smell and taste, these seeds resemble a mixture of musk and amber. They are much esteemed in India for their cordial, stomachic, and antispasmodic virtues. In a powdered state, they are used as an adjunct to coffee by the Arabs. *Faulkner.* One of the most gaudy flowering shrubs in the Tenasserim country is the musk plant, whose large yellow blossoms with blood colored eyes are sometimes seen bedecking European grounds, and whose seeds have been said to be an antidote to snake bites.—*Mason.*

(5509) MUSK RATS TAILS, are the tails of the *Ondatra*, (Lacepede) the Musquash of North America, of which there are three varieties, the black, the pied and the white. The animals are hunted for their furs and upwards of one million of skins are imported into England annually for hat making: their tails are covered with a thin sleek coat of short hairs, have a pleasing odour of musk and are greatly prized in Russia and the Maldive Islands. Their abundance in the northern parts of Russia impress use with the belief that the animal also inhabited Siberia, The Musquash is easily tamed, soon becomes attached and is cleanly and playful.—*Nobis, Eng. Cyc.*

(5510) MUSK-ROOT, the root of a plant brought to England from Russia and Persia, and known also by the name of Sumbul. This root exhales a powerful smell of musk, and has been used in medicine as a substitute for that substance. The plant yielding it is not known, but the root has the appearance of belonging to the natural order *Umbelliferæ*. Its tissues are full of starch.—*Eng. Cyc.*

(5511) MUSKA KA JHAR. HIND

(5512) MUSKITO, MOSQUITO.

Muchr, HIND.
TAM.
TEL.

In a former work on China, 'A journey to the Tea Countries, Mr. Fortune noticed a curious subtance called "mosquito tobacco," or "mosquito physic," for it is known by both of these names, which he had met with for the first time when travelling in the western parts of the province of Chekiang on his way to the Bohea mountains and the great black-tea country of Woo-e-shan. He says, The day before the discovery was made had been very hot, and during the night such swarms of mosquitoes came that neither my servant nor myself had been allowed to close our eyes. I had no curtains with me, and looked forward with dread to many such sleepless nights during the journey. "Why don't you procure some mun-jung-can?" said the boatmen to my servant Delighted to find there was some simple remedy, I sent on shore to the first village we passed, and procured some sticks of this invaluable substance. I found it answer the purpose admirably, and used it every night during the remainder of that journey whenever I happened to sleep, whether in boats, in temples, or in the common inns of the country.—*A Res. among the Chi. p.* 108. Years after, during this Traveller's residence in China, on inquiring as to its composition from a person, at first he was very communicative. He informed him the following articles were used: namely, the sawings of juniper or pine trees (pih heang fun, or sung shoo), artemisia-leaves reduced to powder (nai-hai) tobacco-leaves (ean fun), a small portion of arsenic (pe-za), and a mineral called nu-wang. With regard to the proportions of each, it appeared that, to thirty pounds of the pine or juniper sawings, about twenty of artemisia, five of tobacco, and a small quantity of arsenic were added. But ere we had come to this point my informant's jealousy had been aroused, and his statements were evidently not much to be depended upon. He now began to question me in return for the answers he had given. "What did I want this information for? if I wanted to buy the article he had it for sale, and it was cheap enough."—*A Res. among the Chi. p.* 111. From subsequent inquiries, he ascertained the composition to be Pine and juniper sawings, wormwood leaves, and tobacco-leaves, reduced to powder, a small portion of nuwang and arsenic. Each article was well beaten up with water, then the whole mixed together, and in the form of a thick paste rolled on a slip of bamboo. On exposure to the air the substance dried quickly, and was then put away for sale. When finished the sticks are somewhat like the common joss-sticks of the country, or about the thickness and length of a light walking cane. Another substance, much cheaper than the last, is found in every town and village in the central and eastern provinces of the empire where I have been, and no doubt it is in use over the greater part of China. Long, narrow bags of paper—say half an inch in diameter and two feet long—are filled with the following substances, namely, the sawings of pine or juniper mixed with a small portion of nuwang and arsenic. The proportions are thirty pounds of sawings, two ounces of nu-wang, and one ounce of arsenic. This mixture is not made up in the form of a paste like the latter but simply well mixed, and then run into the bags in a dry state. Each bag being filled is closed at the mouth, and then coiled up like a rope and fastened in this position with a bit of thread. Many hundreds of these coils neatly done up and placed one above another, may be seen exposed for sale in shops during the hot season, when mosquitos are numerous. When about to be used, the thread which keeps the coil together is cut, then the coil is slightly loosened, so that its sides do not touch each other, for if this happened it would ignite at various parts and soon be consumed. The outer end is then lighted, and the whole is laid carefully down upon a bit of a board, when it goes on burning for the greater part of the night. One hundred of these little coils may be bought for a sum equivalent to three pence of our money, and two of them will suffice for a night in an ordinary sized room. A third substance cheaper than either of the above, is made of species of artemisia or wormwood (A. indica) which grows wild on every hill in this part of China. It is the same kind I have already noticed as forming one of the ingredients in the genuine mosquito tobacco, and is that which was used in taking the honey from the bees in the temple of Tein-tung. It is gathered and thoroughly dried, then twisted or plaited into ropes, in which condition it is fit for use. Although cheaper and consequently more in use amongst the poorer classes, than the other kinds, it is not so efficient and it gives out more smoke than is agreeable to a European.—*A Res. among the Chi.* p. 113.—See Bane, also Mosquito.

(5514) MUSLIN.

Neteldoek, Dut.
Mousseline, Fr.
Musselin, Ger. Guz.
Muslin, Eng
Saila Hind.
Moussolina, It.
Kissea, Rus.
Moselina, Sp.
Sana Sella Pel.

A fine cotton fabric, extensively manufactured at Manchester, Glasgow, in France, &c. There are a great variety of kinds and qualities, as, book-muslin, cambric-muslin, mull-muslins, &c. Formerly all muslins were made in the East, and Dacca in Bengal was formerly celebrated for "its webs of woven wind." The Dacca muslin manufacture, which once employed thousands of hands, is quite at an end, so that it was with great difficulty that the specimens of these fabrics sent to the Great Exhibition of 1851, were procured. The kind of cotton (which is very short in the staple) employed, is now hardly grown, and scarcely a loom exists which is fit for the finest fabrics. The jewellers still excel in gold and silver filagree.—*Hooker. Him. Jour. Vol.* II. *p.* 254. At the Madras Exhibition of 1855, the Cambric Muslin bleached and the Isree exhibited by Veerabomma Kristnama Chetty were of a very superior quality and the Jury considered the Manufacturer entitled to a reward of a 2d Class Medal.—*M. E. J. R.* The most celebrated of Indian muslins was that of Dacca Cotton grown in the vicinity, the thread from which does not swell. Chicacole, Upada a few miles north of Cocanada formerly produced fine muslins and at present a strong muslin, generally checked, is procurable at Chicacole at 3 to 6 Rupees per piece of 8 yards, I have had it made to order of very good quality at 11 Rupees the piece. The famous Arnee Muslins, of which *Book* Muslins are an imitation, are prepared near and at Arnee in the Chingleput district: they sell according to quality from ? to ? the piece of ? yards ? inches broad.—*Rhode, M. S. S.*

(5515) MUSQUASH. Is the skin of the musk-rat, a diminutive species of beaver, which is largely used as a hatting fur.—*Waterston.*

(5516) MUSSÆNDA WALLICHII. A species of mussænda with corymbs of orange-colored flowers, and a single sepal expanded into a large white leaf, is not the least interesting shrub to the eye of the curious. In Calcutta an allied species is cultivated in the gardens, but its abundance in Tenasserim forests prevents its introduction into European gardens on this Coast.—*Mason.*

(5517) MUSTARD, BLACK. Tetradynamia Siliquosa, Linn. Sinapis, L. Semina, L. Sinapi E. D. Pulvis Seminum, D. Flour of the Seeds, E. Sinapis Nigra, *Linn.* Common Mustard consists of the flour of the seeds of the Black Mustard, though generally mixed with that procured from the seeds of the White Mustard, or Sinapis alba, and deprived of fixed oil by expression. Both species have been long used in medicine, being the νακυ of Hippocrates, and the Sinapi of the Romans. The Black Mustard is indigenous in almost every part of Europe. *Bot. Ch.* The root is thick and fleshy, the stem about 2 to 3 or 4 feet high, hispid below, with smooth round branches above. Lower leaves large, rough, lyrate, variously lobed and toothed; upper ones narrow, lanceolate, smooth, dependent. Calyx yellowish, equal at base, spreading, Petals obovate, yellow, spreading. Silique small erect, or placed close to the stem, obtusely quadrangular, nearly even and smooth, tipped by a short quadrangular style, but without the proper, often seed bearing beak of the genus ; the valves convex, with one straight dorsal nerve, and a few lateral anastomosing veins. Seeds numerous in a single row, small, round, blackish brown.—*Royle*. Fig. 41.—E. B. t. 96.

Sinapis arvensis, Charlock, or Wild Mustard, E. B. t. 1748, has its seeds sometimes substituted for the Black Mustard. It may be distinguished by the long sword-like beak of the pods, and by the valves being three nerved. The Black Mustard wanting these, has been removed to the genus Brassica by Koch and other botanists. The Mustard plant is officinal on account of its seeds, or rather of the flour of these seeds, so well known as a condiment by the name of Mustard. But Dr. Pereira learnt that the best flour of Mustard is prepared by crushing the seeds of both Black and white Mustard between rollers, and then pounding them in mortars, when they are twice sifted to yield *pure flour of mustard*. Dr. Christison's information confirms that of Dr. Pereira, that common flour of mustard is adulterated, partly on account of the pungency of Black Mustard seed. "Two bushels of black, and three of white seed yield, when ground, give 145 pounds of flour; which, to diminish the pungency and improve the colour, is mixed with 56 pounds of wheat flour and two pounds of turmeric; and the acrimony is restored without the pungency, by the addition of a pound of (capsicum) chilly pods, and half a pound of ginger." (*c.*) Dr. Thomson says he could detect no turmeric, nor cayenne pepper in the specimen which he examined. The *pure flour* of Mustard ought alone to be used officinally. Though Black and White Mustard have both been minutely examined by several chemists, they still require further investigation. The former contains a Fixed Oil, Gummy matter, Sugar, a colouring and a peculiar green matter, a Fatty pearly matter; *Myronic acid* in combination with Potash, or Myronate of Potash (the Sulpho-Sinapisin of Henry and Garot) *Myrosyne*, *Sinapisin*, and some salts.

Sinapis alba, Linn. E. White MUSTARD. The white Mustard is mentioned in the Edinburgh Pharmacopœia as well as the black (v. supra). It is, like the former species, indigenous in most parts of Europe, and may like it have been employed by the Greeks, as it possesses nearly the same properties. *Bot. Ch.* Root tapering, small. The stem 1—2 feet or more high, round, smooth, or slightly hairy. Leaves lyrate, irregularly lobed or pinnatifid, roughish, Sepals linear, green, horizontal. Flowers large, yellow. Silique hispid, spreading on nearly horizontal stalks, short, tumid or knotty from the prominent seeds, shorter than the sword-shaped beak ; valves with 5 straight strong nerves. Seeds few on each side, large and roundish, pale yellow coloured, having in the interior a yellow mass, which is covered by a thin pellicle of what must be composed of condensed mucilage. Fig. 42.—E. B. t. 1677. White Mustard seeds yield about 36 per cent. of fixed oil, and when macerated in water, a thick mucilaginous, almost insipid liquor, while Black Mustard seeds give little mucilage, but a pungent taste to the water. According to the analysis of John, these seeds contain.—1. An acrid volatile oil. 2. A yellow fixed oil. 3. Brown resin. 4. A very little extractive. 5. A little gum. 6. Lignin. 7. Albumen. 8. Phosphoric acid, and salts. White Mustard does not furnish volatile oil ; but, in certain circumstances similar to those with Black Mustard seed, a fixed acrid principle is produced, which, like the volatile oil of Black Mustard, did not previously exist. The *fixed acrid principle* is an unctuous liquid of a reddish colour, without odour, but having a biting acrid taste, analogous to that of Horseradish root. It contains Sulphur. M. Faure states that this same principle is formed in small quantity when Black Mustard is treated with water. *Erucin*, which does not redden the salts of Iron, and contains no Sulphur, is another principle found by Simon. *Tests.* As the common flour of Mustard is that usually employed, instead of the powder of Black, or the mixed powders of the Black and White Mustard, as in the E. P , so it often contains adulterations along with the true flour. But as Mustard flour is sometimes exhibited internally, it is desirable to have it in a pure form. The adulteration of wheat flour can be easily detected, by the test of the Edinburgh Pharmacopœia. "A decoction allowed to cool is not turned blue by tincture of Iodine." Mustard flour is weakened by the addition of wheat flour. A sinipism of mustard may be made with bread-crumb, or the Mustard flour may be spread on a poultice ; vinegar is worse than useless, as like other acids, it prevents the formation of the acrid principle. Messrs. Trousseau and Pidoux found boiling water unnecessary, as a cold poultice produces the same effect as a hot one. but takes a little longer time to produce its effects. The volatile oil is a powerful rubefacient and vesicatory, in the proportion of 1 part to 20 of proof spirit.—*Royle*. Dr. Hassall tells us that the plants from which mustard is obtained are, Sinapis nigra or black, and Sinapis alba, or white mustard, they belong to the natural family Cruciferæ. The black mustard plant, is distinguished by its seed vessels, which are smooth, and the colour of the seeds themselves, which are reddish or blackish brown. In the white mustard plant the vessels or pod are clothed with hairs which render them rough and the seeds are yellow. The two species of mustard differ in properties as well as in botanical characters. The seeds of S. nigra are more pungent, than those of S. alba, but there are other differences. Analyses has detected in black mustard seed several distinct chemical compounds. Mironic acid, Mirocyne, a volatile oil, and a fixed oil of mustard. Of the composition of white mustard we find the following account in Pereira's "Materia Medica." "Robiquet and Boutron (Journ. de Pharm, xvii. p., 179) however have proved, that white mustard contains neither volatile oil, nor any substance capable of producing it, but owes its activity to a non-volatile acrid substance, which does not pre exist in the seeds, but is readily formed in them under certain conditions. Another chemical peculiarity of white mustard is, that it contains sulpho-sinapisin. The young or seed leaves of white mustard are used for salad. In Britain, both species are indigenous and may commonly be seen in flower in the month of June in waste places and fields, in the brick fields in the neighbourhood of Notting-hill they grow in great quantities. McCulloch's Commercial Dictionary contains the following interesting particulars in relation to the growth &c., of mustard. It was formerly extensively cultivated in Durham, but it is now seldom seen n that county. At present it is principally raised in the neighbourhood of York and throughout other parts of the North Riding, and being manufactured in the city of York is afterwards sold under the name of Durham mustard. Two quarters an acre are reckoned a good crop. Mustard is of considerable importance in the materia medica, and is extensively used as a condiment. It was not however known in its present form at our tables till 1720. The seed had previously been merely pounded in a mortar and in that rude state separated from the nteguments and prepared for use. But at he period referred to, it occurred to a woman of the name of Clements residing in Durham o grind the seed in a mill and to treat the meal n the same way that flour is treated. Her mustard was in consequence very superior and being pproved by George I speedily came into general use. Mrs. Clements kept her secret for a considerable time and acquired a competent fortune. n Bengal and other eastern countries mustard is xtensively cultivated as rape is in Europe for he purpose of yielding Oil."—*Barley survey of Durham, page* 147; *London's Encyclopeadia of Agriculture.* The subjoined particulars, in reference to the manufacture of mustard, as furnished y a manufacturer, are given by Pereira:—"The seeds of both black and white mustard are first rushed between rollers, and then pounded in mortars. The pounded seeds are then sifted. The esidue in the sieve is called dressings, or siftings; hat passes through is impure flour of mustard. he latter by a second sifting, yields pure flour of mustard, and a second quantity of dressings: by pressure, the dressings yield a fixed oil which is used for mixing with rape and other oils." Immense quantities of wheaten flour are employed in the adulteration of mustard, and many samples almost entirely consist of it. It has been stated that pea-flour is sometimes used: out of fifty samples of mustard which Hassall submitted to examination he had not met with a single instance of adulteration with any other farina than wheaten flour. *Adulteration with Turmeric powder.* Turmeric powder is the ground tuber of Curcuma longa one of the Zingiberaceæ, it is of a dark yellow colour and consists of large cells, some of these are loosely imbedded in a reticular tissue, but others, and these the majority, are quite free: they may be recognised with facility under the microscope by their size and bright yellow colour. When crushed, each cell is found to contain coloring matter as well as a number of starch granules resembling closely those of Curcuma arrow-root, already described and figured. On the application of iodine the cells become of a deep-blue, and with potash of a reddish colour. Although we have examined a large number of samples of mustard in no instance have we found turmeric powder to be absent. By some means or other probably by moisture and heat the turmeric powder is made to part with a portion of its colouring-matter to the flour which enters so largely into the composition of the mustard of the shops. Four qualities of mustard are supplied by the manufacturer. The first is called "second" it is usually of a bright yellow colour, but is thickly studded over with numerous black or reddish-black points: these are fragments of the husks of black mustard seed. The next quality is termed "fine," it also presents a considerable number of black specks, but fewer than in the former case. The third quality is called "superfine," it is spotted to a much less extent, although minute specks are still visible. The fourth, or best quality, is the "double-superfine," in this the eye can scarcely detect husk at all, although with the microscope, a little may still be discovered. These several qualities are vended to the public by a wholesale and retail establishment in the city of London at the following rates: "seconds," 5d.; "fine," 8d.; "superfine," 11d.; "double superfine," 1s. 2d., per lb. The qualities of the following samples varied much—from "second" to "double-superfine." The price also varied greatly—from 1s. to 2s. the pound, the ordinary charge made being 1s. and 1s. 4d. the pound. Dr. Hassall's inquiries showed,

1st. That genuine mustard, whatever be the price paid for it, is scarcely ever to be obtained.

2nd. That the whole of forty-two samples submitted to examination were adulterated.

3rd. That the adulteration practised, in every case, was the same in kind, varying only in degree, and consisted in the admixture of genuine mustard with immense quantities of wheaten flour, highly coloured with turmeric.—*Food and its adulteration*, *p.* 123.

(5518) MUSTARD OIL. SINAPIS SPECIES.

Rai ka teil, GUZ. HIND.
Sarshapatailum, SANS.
Kadaghoo yunney, TAM.
Avaloe and Sursava Noona, TEL.

An expressed oil, prepared from the seeds of different species of Sinapis, is used in the Northern parts of Hindostan, and in many parts of Malabar, for culinary purposes, in the same way that butter and ghee is on the Coromandel Coast.—*Ainslie.* Mustard oil has of late been exported from Bombay to England and France.—*Faulkner.* Five or six species of Sinapis are cultivated in all parts of India, for the sake of the valuable oil they yield : those most frequently seen are *S. glauca*, *toria* and *racemosa*. The seeds of the "sinapis alba" yields by expression 36 per cent of a bright yellow, pleasant tasted, edible oil, having a strong smell, and slight taste of mustard. The seeds of "sinapis nigra," yield only 28 per cent of an oil in all respects similar to the above. The average price of mustard seed in eighteen large stations, in all parts of the Madras Presidency, for the Quarter ending 31st October 1854 was Rs. 1 2 8 per maund of 25lbs., the maximum being Rs. 1 11 6 at Cannanore, and the minimum As. 10 5 at Nagpore. In Vizagapatam it costs Rs. 208 per Sicca garce. The oil is not exported, from Madras but the seeds have been shipped as follows :—

In the years	1847-48	........Cwt.	5,828
,,	1848-49	.... ,,	6,767
,,	1849-50	.... ,,	9,435
,,	1850-51	.... ,,	9,909
,,	1851-52	.... ,,	3,636
,,	1852-53	.... ,,	16,075

Uses.—This valuable oil, although seldom sold in the market, being made when required, is used in most parts of India in cookery, and is considered superior to all other oils for anointing the body, which it is supposed to invigorate. In medicine, it is sometimes given internally, but is more frequently applied as a rubefacient. At the Madras Exhibition of 1855, the following exhibitors contributed very good specimens, Mr. Kohlhoff of Tanjore, Madras Tariff, Trichinopoly Local Committee, and Rajahmundry Local Committee. Lieut. Hawkes, exhibited a complete and interesting series of oils and oil cake of common mustard, obtained from four different sorts of sinapis.—*M. E. J. R.*

(5519) MUSTARD SEED, BLACK.

Khirdal, ARAB.
Kidi-tsai, CHIN.
Gan-aba, CYNG.
Mosterd, DUT,
Moutarde, FR.
Mustert, GER.
Kalee Rai, GUZ. HIND.
Mostarda, Senapa, IT.
Sinapis nigra, LAT.
Sasavie, MAL.
Sirshuff, PERS.
Mostarda, PORT.
Gortschiza, RUS.
Sirsoon, Rajika, SANS.
Mostaza, SP.
Kadaghoo, TAM.
Avaloo, TEL.

Black mustard seeds are small and roundish. Externally they are beautifully veined, and of a reddish or blackish brown colour, though sometimes whitish. Internally they are yellow. They are inodorous, but have an acrid oleaginous taste, The black mustard is indigenous in almost every part of Europe.—*Pereira.* It is also grown in some parts of India, and has of late years been exported from Bombay to England and France. —*Faulkner.*

(5520) MUSTARD SEED, WHITE.

Suffeid Rai GUZ, HIND.
Sinap Alba, LAT.
Kadoocoo, TAM.

This species differs only in the colour and size of the seeds, which are yellowish, and much larger than the black seed. The properties of the white are less energetic than those of the black. In other respects they agree altogether. —*O'Shaughnessy.*

(5521) MUSTARD-TREE. The plant referred to by this name in Scripture is, according to Dr. Royle, the *Salvadora Persica* of botanists. It is a native of the East Indies. [SALVADORA.]

(5522) MUSTELIDÆ, the Weasel Tribe, a family of Digitigrade Carnivorous Animals, of which the Common Weasel is the type, Among the Polecats of warm climates, Cuvier notices the Javanese Polecat (*Putorius nudipes*, F. Cuv.), the African Polecat *P. Africanus*. Desm), the Striped Polecat of Madagascar (*P. striatus*, Cuv.), and the Cape Polecat (the Zorille of Buffon ; *Viverra Zorilla* of Gmu). The following is a list of the species of Asiatic *Mustelidæ* in the British Museum :—

Martes melanopus, the Japanese Sable. Japan.

M. flaviyula (Hodgson), the White-Cheeked Weasel. India.

Mustela Hodgsonii (Gray,) Hodgson's Weasel. India.

M. Cathia (Hodgson), the Cathia. Nepaul.

M. Horsfieldii (Gray), Horsfield's Weasel. India.

M. Subhemachalana, the Nepaul Weasel. Nepal.

Helictis moschata (Gray), the Helictis. China.

H. Nipalensis, the Nepaul Helictis. Nepaul.

Mydaus meliceps (F. Cuvier), the Stinkard, or Teledu. Java.

Arctonyx collaris (F. Cuvier), the Balisaur, or Sand-Bear. India.

Lutra Chinensis (Gray), the Chinese Otter: China and India.

L. aurobrunnea (Hodgson), the Golden-Brown Otter. Nepaul.

Aonyx leptonyx, the Wargul. India.—*Eng.Cyc*

(5523) MUTILLA ANTIGUENSIS, Linn Mutilla occidentalis seems to be a different kin of the former. Beer botie is a most beautifu scarlet velvet colored insect, about the size of large pea, but flattish, it is commonly found i rainy weather, in Hindostan and at Lahore. These insects are officinal, and are kept by th druggists. The native doctors use them agains snake bites, and in colic of horses.—*Honigberger, p.* 513.

(5524) MUTHERIE, the Tamil name of a Ceylon-wood known in England by the name of satin-wood; by the Portuguese it is called Buratu. It is a handsome and valuable wood, and may be considered the most durable of any in Ceylon for general uses, provided it is seasoned in the shade: it may be converted into handsome furniture, &c. In consequence of its weight all trees are cut in lengths of from ten to twelve feet, for the purpose of getting it floated down the rivers from the forests, which is done in canoes. I am of opinion that it may be obtained from twenty-five to forty feet long, and the largest diameter thirty-six to forty inches. That which is in general brought to the dockyard is about fifteen feet long, and from eighteen to twenty-four inches in diameter, being cut to that size for the ease of conveyance.—*Edye. Ceylon.*

(5525) MUTKE KE PULLIE. Dolichos Fabæformis. Small Sabre Bean. This is grown the same as the larger sort.—*Riddell.*

(5526) MUTTI, ALSO MUDDI.

Chuncoa CAN. | Muttia, BUCK.

Mutti (or Muddie) is the Canarese name of a good timber tree, common in some of the woods of the Malabar coast, the ashes of the bark of which the Natives use to chew with betel like Chunam.—*Ainslie's Mat. Med. p.* 266.

(5227) MUTTY PAL, the resinoid exudation of "*Ailanthus malabaricus*" D. C., is a peculiar substance, first mentioned by Buchanan, who observed it in the Animalay Forests. It is exhibited from Cochin and Travancore, and is said to be used as incense.—*M. E. J. R.*

(5528) MYLABRIS. The ancients chiefly employed two species of *Mylabris*, one of which, the *Mylabris cichorii* (vern. *telini* HIND.) has been used for ages, and is so at present by the European and native physicians of India and China. The blistering flies of India are chiefly the Mylabris or Meloe cichorii, the Cantharis gigas, and the Cantharis violocea. The *Meloe* or *Mylabris cichorii* (Telini, *Hind.*) is common in the neighhourhood of Dacca, in the Hydrabad country, in Kurnool, and numerous other localities. Dr. Hunter published a good account of this article in the 5th vol. of the *Transactions of the Asiatic Society*, p. 216. The insect is about an inch long, and ⅓ broad; the elytre or wing coverts are marked with six cross stripes of deep blue and russet brown. The *Buprestis* of ancient writers is met with in the bazars under the name of the golden fly (*sonamukki.*) The *Cantharis violacea* is often mixed with specimens of *Meloe* in the bazars. The Telini fly, if procured before the mites have commenced its destruction, yields on an average one-third more of cantharidin than the *Spanish fly* of the European shops. The blue fly is of uncertain strength; the Buprestis in all the specimens obtained, was quite inert.—A species of Meloe called the *M. trianthema*, from its being usually found on the plant named *Trianthema decandra* (biscopra, *Hind.*) was described by Dr. Fleming. A tincture, acetous tincture, plaster, and ointment of the Meloe cichorii are described in the Bengal Pharmacopœia. Some prejudice exists against the article on account of its alleged excessive severity of action. This is solely owing to the presence of a greater quantity of *Cantharidin* than that contained in the common fly. Diluting the tincture, and adding to the proportion of lard and wax in the plaster and ointment, perfectly assimilate the action of the indigenous and the imported insects.—*O'Shaughnessy, page* 684. At the Madras Exhibition of 1855, specimens of the Indian Blistering beetles, *Mylabris pustulata*, and *punctum* were exhibited by Monsieur Le Docteur Collas of Pondicherry. These were accompanied with a full and interesting report on their blistering properties printed in the "*Moniteur Officiel*" of 2d March 1855. The larger species is *Mylabris pustulata*, and the smaller is *Mylabris punctum*—Both insects are found in large quantities at certain seasons all over Southern India. On account of Dr. Collas' careful researches into the natural history of these beetles, as well as his interesting report, and successful experiments with this therapeutic agent, the Jury awarded him a 2d Class Medal. —*Royle, O'Shaughnessy*; *M. E. J. R.*

(5529) MYMENSING. *The District of Mymansing* can furnish specimens of the best *sunn* (Crotolaria Juncea) and the best *pât* or *jute* (Corchorus Olitorius) and *maestee pât*, (Hibiscus Cannabinus) grown in Bengal. The fibres of these plants which are so commonly used in that country for making twine, ropes, sails, screens, bags, and paper, are dressed and exported, in large quantities, from Serajegunge and other parts of this district of Bengal, to Calcutta for shipment to England. From this district there might also be obtained samples of oil seeds, as mustard, sesamum, rape and linseed. The two latter are of a superior quality and aré now valuable exports to England.—*Taylor.*

(5530) MYOSOTIS (from *μυς*, a mouse, and *ωτ*, the crude form of *οὖς*, an ear), a genus of Plants belonging to the natural order *Boraginaceæ*. It has a 5-parted calyx; the corolla salver-shaped contorted in æstivation; the throat closed with scales, the limb 5-fid, obtuse; the stamens included, with filaments very short; the style simple; the nuts smooth, externally convex, keeled within attached by a minute lateral spot near their base. This genus is distinguished from all the other Boragineous genera by the possession of a contorted æstivation of the corolla. The species are annual or perennial, rough or smoothish plants, with blue flowers in terminal racemes, which are revolute before expansion. About 50 species have been described, which inhabit the more temperate parts of Asia, Africa, and America, and are abundant in Europe. Eight species are found in Great Britain.—*Eng. Cyc.*

(5531) MYOSOTIS PALUSTRIS. Great Water Scorpion-Grass, or Forget-Me-Not, has the calyx open when in fruit, and shorter than the pedicel, with straight adpressed bristles; the teeth short, triangular; the limb of the corolla flat, longer than the tube; the lobes slightly emarginate; the pubescence of the stem spreading. It is a native throughout Europe, and also of Asia and North America. In Great Britain it is found in humid meadows, bogs, banks of rivers, rivulets, and ditches. This plant has a large bright blue corolla with a yellow eye. It is a beautiful plant, and when once seen will be seldom forgotten. It is probably on this account that it has obtained its common name Forget-Me-Not. Amongst the young it is regarded as emblematical of true affection. A variety is described with white flowers.—*Eng. Cyc.*

(5532) MYRICA. Fortune notices one repeatedly: It is (the Greek Μυρίκη), a genus of Plants the type of the natural order *Myricaceæ.* It has its flowers in catkins, which are composed of concave scales; 4 to 8 stamens. The fruit a 1-celled 1-seeded drupe, and no perianth. There are several species of this genus, which are shrubs or small trees—*Eng. Cyc.* Wight gives Myrica Integrifolia, 766; and Nilagirica, 938. Fortune says, in China the *Yang mae,* appears to be a species of *Myrica,* allied to the Himalayan *M. sapida,* noticed by Frazer, Royle, and other writers. The Chinese variety is, however, much superior to the Indian. Indeed I believe the Chinese have both, but use the Indian one as a stock for grafting upon—*Fortune, page* 344. There is a very large plantation of this tree in Chusan, and the fruit was beginning to be brought to the market during my stay there. It was sold at a very cheap rate, and was considered a great luxury by the native.—*page* 345. I had frequently seen the trees of the *Yang-mae,* but never when in fruit, so I determined to visit one of the plantations. *page*—345. On the sides of these inland hills there were large quantities of the *Yang-mae.* The trees were bushy, round-headed, and from fifteen to twenty feet in height. They were at this time loaded with dark-red fruit, not unlike, at first sight, the fruit of England's Arbutus, although very differently formed and much larger. I observed two kinds, one with red fruit, and the other with fruit of a yellowish colour. The trees formed most striking objects on the hill side. —*Ibid. p.* 345. The "Yang-mae," a species of Myrica, was also met with on these hillsides, snd some grafted plants secured for India. These are now luxuriating in the north-west provinces. This fine fruit will no doubt succeed admirably in the Himalaya, for already there is a variety—far inferior indeed to the Chinese kind, but yet a plant requiring the same soil and temperature—common on these hills. It is the Kaiphul of the hill-tribes of India.—*Fortune's Residence.* Having been engaged in procuring some Yang-mae trees, which the Government of India was anxious to introduce to the Himalaya, I was somewhat better informed upon this subject than the learned Chinaman. I told him the fine variety of Yang-mae was grafted upon the wild kind, which the Chinese call the san or hill variety (Myrica sapida); and further, I showed him some plants which I had just purchased: but all was of no use; he was "convinced againt his will," and still firmly believes the Yang-mae is usually grafted on the pine.—*A. Res. among the Chi. p.* 64.

(5533) MYRICA CERIFERA. Wax-Myrtle, or Bay-Tree, has cuneate-lanceolate leaves, sometimes entire, but more frequently toothed, particularly towards the end, somewhat pubescent, a little paler beneath, and generally twisted or revolute in their mode of growth; has a branching half-evergreen stem, from 1 to 12 feet high. The small flower is formed by a concave, rhomboidal scale, containing three or four pairs of roundish anthers, on a branched footstalk. The pistiliferous catkins which grow on a different shrub are less than half the size of the staminiferous ones, and consist of narrower scales, with each an ovate ovary, and two filiform styles. To these catkins succeed clusters or aggregations of small globular fruits, which are at first green, but finally become nearly white. They consist of a hard stony covering, which incloses a dicotyledonous seed. The hard covering is studded on its outside with small black grains, and over these is a coating of hard white wax, fitted to the grains and giving to the surface of the fruit a granulated appearance. This plant is a native of woods in the United States of America. The bark of the root of this plant is acid and astringent; in large doses it produces vomiting, accompanied by a burning sensation in the throat. It is used as a stimulant and astringent. The wax of the fruit is collected and purified, and used for many of the purposes for which bees'-wax and candles are employed. The wax has been occasionally used in pharmacy in the same way as common bees'-wax.—*Eng. Cyc.* The Candleberry Mystle abounds in the Bahama Islands. The shrub produces a small green berry, which, like the hog plum, puts out from the trunk and larger limbs. Much patient labor is required in gathering these berries, and from them is obtained a beautiful green wax, which burns very nearly, if not fully, as well as the spermaceti, or composition candles imported from abroad. Not long since Mr. Thos. B. Musgrove, of St. Salvador (or Cat Island), obtained about 80 lbs. of this wax, and made some excellent candles of it. The method of procuring this wax is by boiling the berries in a copper or brass vessel for some time. Iron pots are found to darken and cloud the wax. The vessel after a sufficient time is taken from the fire, and when cool the hardened wax, floating on the top of the water, is skimmed of.

(5534) MYRICA CORDIFOLIA.—According to the experiments of M. Cadet and Dr. Bostock, myrtle wax differs in many respects from bees' wax. Specimens of it assume shades of a yellowish green color. Its smell is also different; myrtle wax, when fresh, emitting a fragrant balsamic odor. It has in part the unctuosity of bees'-wax, and somewhat of the brittleness of resin. Its specific gravity is greater, insomuch that it sinks in water, whereas bees'-wax floats upon it; and it is not so easily bleached to form white wax. The wax tree of Louisiana contains immense quantities of wax. Mr. Moodie ("Ten Years in South Africa") says,—"I occasionally employed my people, at spare times, in gathering wax berries that grow in great abundance upon small bushes in the sand hills, near the sea, and yield a substance partaking of the nature of wax and tallow, which is mixed with common tallow, and used by the colonists for making candles. The berry is about the size of a pea, and covered with a bluish powder. They are gathered by spreading a skin on the sand, and beating the bush with a stick. When a sufficient quantity of the berries are collected, they are boiled in a great quantity of water, and the wax is skimmed off as fast as it rises; the wax is then poured into flat vessels and allowed to cool, when it becomes hard and brittle, and has a metallic sound when struck. The cakes thus formed are of a deep green colour and are sold at the same price as tallow. The wild pigs devour these berries when they come in their way, and seem very fond of them." A good specimen of myrtle, or candleberry wax, accompanied by candles made from it in the crude unbleached state in New Brunswick, was shown at the Great Exhibition. At a meeting of the Central Board, at Cape Town, in March, 1853, the members voted about £300, to employ some 20 or 30 men, in gathering berries from the Downs, and making wax during the winter months, that is, from the beginning of May to the end of September. The wax fetches a good price in the Cape market. In the annual report of the Cape of Good Hope Agricultural Society, in May, 1853, a very fine sample of myrtle, or berry wax, grown on the Cape Flats, was exhibited by Mr. Feeny, Superintendent of the Road Plantation, by direction of the Commissioners of the Central Road Board, in different stages of purification, from green to white, as also some candles; and it being conceived by the meeting that this article might ultimately become one of considerable importance for purpose of export, a letter of thanks was addressed to Mr. Feeny; and Nathaniel Day, the constable who assisted him, was presented with the sum of £5, as a remuneration for his trouble in assisting to purify and prepare the wax. On reference to the juror's report on the Great Exhibition, it will be gratifying to find that the berry wax, forwarded by this Society, had attracted peculiar notice, and a prize medal been awarded for it; the following reference is therein made to it: "some fine specimens of myrtle or berry wax, from the Cape of Good Hope, are exhibited by J. Lindenberg, of Worcester. This is an excellent material for the manufacture of candles, when employed in conjunction with other solid fats. The jury awarded a prize medal for these specimens." The Committee suggested every possible attention being drawn to this subject, in which they are gratified to state, the Commissioners of the Central Road Board have evinced a readiness to cooperate, by offering to place at the Society's disposal the sum of £10 10s., "to be given as a premium for the best information respecting the wax berry plant, the soils and situations in which it is found to grow most luxuriantly: the best mode of propagating and cultivating it, of collecting the berries, and extracting and preparing the wax, &c." And from a letter received from the Secretary to the Central Road Board, it appears that the Board had authorised the shipment to England of 2,561 lbs. of the wax, by the *Queen of the South* in November last, which, from the account sales lately received from Messrs. J. R. Thomson and Co., realised as follows, viz.:—

			£	s.	d.
4 cases weighing nett	856 lbs. a	8d.	£23	10	8
4 ,,	1040 lbs. a	9d.	39	0	0
3 ,,	745 lbs. a	11d.	34	2	11
3 ,,	6 lbs. a	11d.	0	5	6
			£101	19	1
Discount 2½ per cent.			2	11	0
			£99	8	1

CHARGES.

	£	s.	d.
Warehouse Entry 3s. 6d. Fire Insurance 2s., Port 2s. 6d	£0	8	0
Freight....................................	7	3	3
Primage.....................................	0	14	4
Dock Charges............................	3	9	6
Sale Expenses..........................	0	9	0
Brokerage.................................	1	0	6
	£13	4	7
Commission at 2½ per cent	2	11	0
	£15	15	7

Simmonds.—Of the Myrica Cordifolia of the Cape, so long since as 1840, it was mentioned that the wax was used for candles.—*O'Shaughnessy, page* 612.

(5535) MYRICA INTEGRIFOLIA. Roxburgh Fl. Ind. iii. p. 765, from the N. E. frontier, seems to be different from M. sapida, its fruit is acid and used for pickling—*O'Shaughnessy, page* 611.

(5536) MYRICA NILAGIRICA. Wight. Icon, 938.

(5537) MYRICA SAPIDA. Wall. Tentam. Nipal. t. 45

Kuephul, Hind.

Himalayas from the Sutlege to Nipal, fruit agreeably flavoured. The same, or a nearly allied species, is found in China and Japan. The bark (Kuephul) is aromatic and stimulant, and a favourite native medicine.—*O'Shaughnessy.*

(5538) MYRICACEÆ, *Gallworts*, are plants constituting a very small natural order of apetalous Exogens, with separate sexes. The most essential part of their character is expressed by Endlicher in the following terms:—"Flowers unisexual. Males—Bractlets, 2; calyx, 0. Females—Hypogynous scales from 2 to 6; ovary 1-celled, with 2 styles; ovule 1, erect, orthotropous; drupe 1-seeded; seed erect; embryo without albumen; radicle superior." In general, their flowers are arranged in a manner similar to those of *Betulaceæ* and *Salicaceæ*, with which latter however they seem to have no real affinity. From *Casuaraceæ* curious Australian trees, with jointed leafless stems, like those of *Equisetum*, they are only distinguished by their erect ovule and orthotropous seeds. They are common in the temperate parts of the world, especially in North America, and the Cape of Good Hope. The order embraces 3 genera and about 20 species. —*Eng. Cyc.*

(5539) MYRISTICA. a genus of Plants, the type of the order *Myristicaceæ*. The flowers are diœcious; calyx urceolate, 3-toothed; filaments of stamens monadelphous: anthers 6 to 10, connate; ovary simple; style, none; stigma 2 lobed; pericarp fleshy, 2-valved, 1-seeded, seed enveloped in a fleshy aril.—*Eng. Cyc.*

(5540) MYRISTICA CINEREA. MYRISTICACEÆ.

Sandikai marum, Tam.

A tall straight growing tree, usually with fine clean bole. Wood light coloured, close, even grained, apparently of fine quality.—*Wight.*

(5541) MYRISTICA MOSCHATA,

Jadikai, Tam.
Jawpull, Duk.
Jaephall, Hind
Jowzbewa, Pers.
Jowzulteib, Arab.
Booapala, Malay,
Jatafala, Sans.
Nutmeg tree,, Eng.

Myristica, L. E. Nux Moschata, D. Nuclei, L. D, Kernel of the Fruit, E. of Myristica officinalis, *Linn.* E. (*M. Moschata*, Thunb. L. D. Nutmegs, Macis Involucrum, D. (arillus) of the Nut. Mace. Adeps et Oleum, *Diœcia Monadelph.* Linn.

A diœcious tree, 20 to 25 feet high, a native of the Moluccas, especially of Banda.—*Ainslie's Mat. Med. p.* 264 —*O'Shaughnessy.* The Nutmeg-tree is about 25 to 30 feet high, with some resemblance to a Pear-tree. Leaves faintly aromatic, alternate, sub-bifarious, with short petioles, oblong, somewhat obtuse at the base, acuminate, glabrous, above darkgreen, paler beneath. *Male.*—Racemes axillary. Flowers small, yellowish, the pedicels of each supported by a minute bract. Calyx urceolate, 3-toothed, thick and fleshy, with short reddish pubescence. Filaments united into thick oblong, and obtuse column. Anthers about 9, (9 pairs, *Roxb.*), linear-oblong, attached round the upper part of the filamentous column, 2-celled, free at their base, opening longitudinally *Female.*—Peduncles usually solitary, axillary. Perianth much as in the male. Ovary ovate. Style short. Stigma 2-lobed, persistent. Fruit pyriform or nearly spherical, about the size of a peach. Pericarp fleshy, spitting from the apex into two equal, thick, fleshy, astringent valves, and displaying the deep-orange or scarlet coloured *arillus* or *Mace*, which cut into many irregular denticulate stripes embraces the nut so tightly as to impress it with superficial furrows. Nut ovoid, attached by a large umbilicus to the bottom of the cell; its shell is hard, of a dark brownish black colour, and glossy, with its inner co t of light-brown colour, thin, but spongy. closely investing the seed. *Seeds* or *Nutmeg* conform to the shell, and consisting chiefly of albumen, into with the inner coat of the shell dips deeply, giving it a variegated, brownish-veined, or *ruminated* appearance; while fresh rather soft, juicy, and more fragrant than after being dried. Embryo at base of albumen, erect, pateliform. Cotyledons 2., thick, fine-shaped, margins irregularly cut, Plumule of 2 unequal lobes. Radicle inferior, hemi-spherical.—Roxburgh chiefly. Fl. Ind. iii. p. 844. Coram, Plant. iii. t. 267. Nees von. E. 133. St. and Ch. 104.—*Royle. M. officinalis*, Linnæus (*M. Moschata*, Thunberg; *M. aromatica*, Roxburgh), is the Nutmeg-Tree. This tree is a native of the Molucca Islands, especially of Banda, but cultivated in Java, Sumatra, and elsewhere in the East, and lately in Cayenne and several of the West India Islands. It yields nutmegs and mace, the best of which are produced in the first-mentioned islands. The fruit is of the size and form of a peach, and, when ripe, the fleshy part separates, into two nearly equal halves, exposing the kernel surrounded by an arillus, the former being the nutmeg, the latter the mace. The arillus is red when gathered; but being sprinkled with sea-water and dried it assumes an orange-yellow colour. It has a fatty shining appearance, yet is horny and brittle. The odour is strongly aromatic; the taste aromatic, but sharp and acrid. It contains both a fixed oil (in small quantity) and a volatile oil. One pound of mace yields by distillation one ounce of the latter. The former is not an article of European commerce, and what is termed the expressed oil of mace, is obtained from the nutmeg, and should bear its name. An inferior mace is obtained from various species of *Myristica*, specially the *M. tomentosa* and *M. officinalis* (Martius), which is a Brazilian tree. The properties of mace are similar to those of the nutmeg. On the removal of the mace is seen the shell, of an oval or ovate shape, and of a dark-brown colour, in which is contained the seed or nut. This is closely invested by an inner shell or coat, which dips down into the substance of the albumen of the seed, and gives it the character which is termed ruminated. Two or three gatherings of the nutmegs are made in the year, generally in July and August, in December, and in April. The third period yields the best nutmegs. The collected nuts are dried in the sun, or by the heat of a moderate fire, till the shells split: they are then sorted and dipped in lime-water, to preserve them from the attacks of insects. The nuts are about an inch long, of the size of a hazel nut, but with a furrowed or sculptured surface. Those of good quality should be heavy each weighing, on an average, 90 grains. The internal aspect s marbled and of a fatty appearance. The subtance is gray; but the veins, which are of a eddish-brown, consist of cellular tissue abounding in oil, and are the processes of the internal oat already mentioned. Odour agreeable, strongy aromatic. Taste warm, aromatic, oily. Beides the fixed oil, it contains a volatile oil, ighter than water, being of the specific graity of 0·931-47, while a spurious, oil of nutmeg is only 0·871. By keeping, it deposits stearopten, or muscat-camphor, called Myristiine. The solid or fixed oil consists of stearine nd elaine, with a light portion of volatile oil inermixed. Both the fixed and volatile oils are sed for medical purposes. Of the fixed, there re two varieties, the English and Dutch, of which the former is the better. It occurs in pieces, wrapped in leaves of the banana, weighng about three-quarters of a pound. When cut nto it has a uniformly reddish yellow colour. The Dutch sort is in large pieces, wrapped somemes in leaves, sometimes in paper, and of a ghter yellow colour. Both are frequently adulerated. The volatile oil is also mixed with puified oil of turpentine. Nutmegs are frequently ither digested in alcohol or distilled to abstract he volatile oil, and then passed off as fresh. uch nutmegs are lighter, and when a hot needle inserted do not give an oily coating to it. Old, orn-eaten, or wild nutmegs should be rejected. enuine or cultivated nutmegs are called female, distinguish them from the male or wild nutmegs, which are the produce either of the *M. Moschata*, var. *sphenocarpa*, or of *M. tomentosa* Thunb). These are longer, heavier (weighing encrally 110 grains), and of inferior quality. They are more apt to cause narcotic symptoms, iddiness, &c., than the true sort. The coarse trong-smelling nutmegs from Santa Fe are from the *M. otoba*. Other species also yield nutmegs —as *M. spuria*, in the Philippines: *M. Madagascariensis* and *M. acuminata*, in Madagascar, and *M. Bicuiba*, in Brazil. Some nutmegs have little or no odour, as the *M. fatua*, but they nevertheless act powerfully on the system. *M. smuria* yields a crimson juice, which is employed in the Philippines as a substitute for dragon's blood. Nutmegs and mace, from the large quantity of volatile oil, are decidedly stimulant, and when used in abundance produce, by exciting the circulation, narcotic effects. In moderation they promote the appetite and assist digestion.—*Eng. Cyc.* This tree has been introduced into India from the Eastward. The fruit ripens in the rains: it is the size of a large plum, with a green covering, and upon being opened, discovers a net-work of a dark red color surrounding the nut, which has a most beautiful appearance: this is the spice known as mace. "The first care of the cultivator is to select ripe nuts and to set then at the distance of a foot apart in a rich soil, merely covering them very lightly with mould. They are to be protected from the heat of the sun, occasionally weeded, and watered in dry weather every other day. The seedlings may be expected to appear in from thirty to sixty days, and when four feet high, the healthiest and most luxuriant, consisting of three or four varieties, are to be removed in the commencement of the rains to the plantation, previously cleared of trees and underwood by grubbing and burning their roots, and these placed in the holes dug for their reception at the distance of eighty feet from each other,—screening from the heat of the sun, and violence of the winds. They must be watered every other day in sultry weather; manured once a year during the rains, and protected from the sun until they obtain the age of five years. The nutmeg tree is monœcious as well as diœcious, but no means of discovering the sexes, before the period of inflorescence, is known. Upon an average, the nutmeg tree fruits at the age of seven years, and increases in produce till the fifteenth year, and is said to continue prolific for sixty or eighty years. Seven months in general elapse between the appearance of the blossom and the ripening of the fruit: and the produce of one bearing tree with another, under good cultivation, in the fifteenth year may be calculated at five pounds of nutmegs, and a pound and a quarter of mace. It bears all the year round, but more plentifully in some months than others, and generally yields more abundantly every other year. It is necessary that the roots of the trees during their growth should be kept well covered with mould, for they have a tendency to seek the surface. The growth of the lateral branches is to be alone encouraged, and all suckers, or dead and unproductive branches, are to be removed with the pruning knife, and the lower shoots lopped off, with the view of establishing an unimpeded circulation of air."—*Penang Gazette. Riddell.* MACE. The arillus or (Jawatri, *Hind.*) is thick, between horny and fleshy, much lacerated, folded and anastomosing towards the extremity, almost enveloping the nut; when fresh, brilliant scarlet, when dry, more horny, yellowish brown and brittle. The smell and taste of the arillus are peculiarly fragrant and agreeable. It softens, but does not dissolve in the mouth. Beneath the arillus is found a bony shell, which covers the almond or kernel; this shell is thin, hard, brittle, brown and shining above, pale grey within, insipid and inodorous and encloses the nutmeg of commerce. NUTMEG. The kernel, Juephul, *Hind.* Jatiphali, *Sans.* (*nutmeg muscade*) is large, rounded, obtuse at both ends, the size of a small Myrobalan nut, smooth, marked with reticulated chinks, those transversely placed being less evident than the longitudinal; grey externally. In the chinks occurs a whitish powder, apparently chalk; internally the almond is traversed by branching, reddish, irregular greasy veins, giving it a marble appearance. The nut is hard, and easily cut, scraped, or grated, very inflammable, but the smoke is devoid of the fragrance of the acid. The odour of the nutmeg is most agreeably aromatic: its taste hot, and analogous to the smell. The nut readily divides under the teeth, and is partially soluble in the saliva. Nutmegs are much injured by time, becoming the prey of insects, which perforate them in every direction; sometimes good nutmegs are adulterated with others from which the valuable principles have been extracted by alcohol. Worm-eaten nuts are also fradulently repaired by the introduction of a paste of flour and nutmeg oil into the holes. —*O'Shaughnessy, p.* 535.

Essential Oil of Nutmegs.—White, lighter than water, acrid, pungent taste and very powerful nutmeg odour,—*O'Shaughnessy, p.* 535.

Fixed Oil, or Butter of Nutmegs.—This occurs in commerce (in Europe) in flattened masses, of square form, yellowish, solid, internally marbled, 500 parts containing about 50 of essential oil. This substance is much adulterated, particularly with suet, spermaceti, marrow, wax, the oil of the Moringa pterygosperma coloured with alkanet or *rocou*, &c. &c. The fixed oil is obtained by bruising the nutmegs into a paste, which is compressed in bags between hot metallic plates. Two kinds are found in commerce—one in small earthen pots, of mace colour, and very agreeable smell, is exported from the Moluccas to Holland chiefly; the second kind is obtained from Holland, occurs in flat cakes, is far inferior to the first, and is usually adulterated with spermaceti. —*O'Shaughnessy, p.* 535. The chief use of nutmegs is as a spice, and for the preparation of perfumes and scented soaps. The tree, according to Mr. Fee, was altogether unknown to the ancients, and Κωμακον of Theophrastus and the *Cinnamomum* of Pliny have been erroneously regarded as identical with this. Avicenna seems to have been the first who described it under the same "*Jauzboa.*" The tree itself however has only been identified clearly within the last few years. The nutmeg tree is chiefly cultivated in the Banda islands, but plantations are now numerous at the Mauritius, Bourbon, Cayenne, Martinique, and in the English possessions to the Eastward, especially in Province Wellesley of Penang—also in the Tinnevelly district of Southern India. The natives of the Moluccas gather the nutmeg fruit by the hand, strip off and reject the pulpy pericarp, detach the mace carefully, and expose it to the sun, which soon changes its blood-red colour to a light brown, it is then sprinkled with sea-water to render it flexible, and to preserve it. The nuts are first sun-dried, and then smoked, until the kernel rattles against the shell. This envelope is then broken, and the kernels dipped twice or thrice in lime water. They are then heaped together for two or three days, wiped, and packed in bales or barrels. The nutmegs thus prepared have been long termed, "female," or "cultivated," in commerce, to distinguish them from a kind named the "wild" or male, which is less esteemed, and seldom found in European trade.—*O'Shaughnessy, p.* 536.

(5542) MYRISTICA TOMENTOSA. "Male nutmeg tree." Also a native of the Moluccas. The fruit is larger than in the preceding species, downy, its substance fleshy, more solid, and firm. The kernels is covered by a hard shell provided with a pale arillus, the kerne is 1½ to 2 inches long, elliptical, the parenchyme devoid of marbling. Its odour is weak, flavou disagreeable. The mace of this nutmeg is distinguished from the true mace by being forme of three or four regular bands united at the summit. The chemical composition of the article is analogous to that of the true nutmeg, but th oils are so inferior in proportion, that the "male" nutmeg is but of little commercial value.—*O'Shaughnessy, p.* 537.

(5543) MYRISTIC OTOBA. *Syn.* VIROL SEBIFERA, Lamarck. *Myristica sebifera.* I Santa Fe, also yields aromatic nuts. A larg tree of Cayenne and Guiana, the seeds of whic when boiled with water give out a large quantit of a fixed oil, used for making candles. A acrid juice also excudes from incisions in th bark, and is employed as a popular medicine.—*O'Shaughnessy, p.* 537.

(5544) MYRISTICACEÆ. NUTMEGS, family of Plants belonging to the division Diclinous Exogens. The species are tropica fragrant, aromatic trees, with an astringent juic alternate coriaceous simple leaves, without st pules, and diœcious flowers. Of the flowers, t males have monadelphous stamens; the femal have a single 1-celled ovary, containing an ere seed; and both have for calyx a tubular cori ceous envelope, with from 2 to 4, usually 3, valvate teeth. Their fruit is a 2-valved succulent capsule, containing a single seed enveloped in an aril, and consisting of ruminated albumen, abounding in a powerful and agreeable aromatic secretion; the embryo is very small, and placed in a cavity at the base of the albumen. The order is nearly allied to *Anonaceæ*, from which however it differs very remarkably in the total want of a corolla, and in the reduction of the number of carples to one. To section it in the artificial division of Apetalous Exogens, as is usually done, is to violate every principle of natural classification. The Nutmeg of the shops, which is the seed of *M. officinalis*, is the only product of the order employed officinally. Other species bear fruit that may be employed as a substitute, but they are all inferior to the real Oriental *Myristica*. This order embraces 5 genera and about 35 species. The genera are, *Myristica*, *Virola*, *Knema*, *Pyrrhosa*, and *Hyalostemma*: *Virola sebifera* yields a fatty oil on being heated, *Pyrrhosa tingens* yields a crimson dye, with which the natives of Amboyna stain their teeth.—*Eng. Cyc.*

(5545) MYRRH. MYRRHA, Gummi Resina, Balsamodendron (Protium) Myrrha, *Nees*. L. E. Myrrh. Octand. Monog. Linn.

Murr, ARAB.
Madu, BALI.
Mirrhe, DUT.
Myrrhe, FR.
Myrrhen, GER.
Herabole, GUZ. & HIND.
Mirra, IT.
Madu, JAV.
Myrrha, LAT.
Manisan lebah, MAL.
Mirra, PORT.
Vola, SANS.
Valatipolum, Palendra-bolum, Villeybolum, TAM.
Bolintrabolum, TEL.

Myrrh is first mentioned in Exod. xxx. 23, by the name of *Mor* or *Mur*. The Arabic name also is *Mur*. The Greeks called it μυρρα, and also Σμυρνα. Herodotus mentions it as produced in the South with Frankincense, &c. Dioscorides states the variety called *Troglodytica* to be the best. In the Periplus of the Red Sea, Arrian mentions Myrrh with Olibanum as exported from the coast of Barbaria, that is, the modern Berbera. Bruce learnt that it was produced, as well as Frankincense, in the country behind Azab, or in that of the Dankali. The embassy to Abyssinia under Major Harris met with it on the hills in the comparatively flat country which extends from Abyssinia to the Red Sea near the Straits of Bab-el-Mandeb, or from the Doomi Valley to the banks of the Hawash. Mr. Johnston (Trav. i. p. 249) met with it in nearly the ame locality. Both authors describe the Myrrh as exuding from wounds made in the bark, and that it is collected in January and March (H.), but chiefly in July and August, and in small quantities at other times of the ear (J.), and exchanged for Tobacco with he merchants who proceed to Berbera, &c., whence it is exported to the coast of Arabia. Dr. Malcolmson wrote to Dr. Royle from Aden, that it is exported in native boats from different ports in the Red Sea, but chiefly from Berbera, Zela, and Massowah, and adds "there is no Myrrh produced in Arabia." Myrrh, it is well known, now reaches Europe chiefly from Bombay, having been imported from the Arabian and Persian Gulfs. It used formerly to be obtained also from Turkey. Some Myrrh, however, appears to be produced in Arabia, as Ehrenberg and Hemrich found a small tree in Arabia near Gison, on the borders of Arabia Felix, from off which they collected some very fine Myrrh. There is still considerable uncertainty respecting the plant or plants which yield Myrrh, though it is probable they all belong to the genus Balsamodendron.

Balsamodendron Kunth.—Amyris. Protium. *Wight and Arnott.* Flowers often unisexual. Calyx 4-toothed, persistent. Petals 4, linear, oblong, induplicately valvate in æstivation. Stamens 8, inserted like the petals under the margin of the annular disk or torus, which is cup-shaped, fleshy, deeply cernated. Ovary 2-celled. Style short, obtuse, 4-lobed. Drupe globose or ovate, nut thick and very hard, bony, 2-celled, (one of the cells by abortion, often obliterated,) cells one-seeded Balsam producing trees. Leaves with 3 to 5 sessile leaflets, which are without dots.

Balsamondendron Gileadense, K. Unarmed. Leaves palmately 3-foliolate, petiolate, smooth; leaflets obovate, oblong, very entire, glabrous; pedicels short, single-flowered, with the calyx broad, shallow, and campanulate.—This includes the *Amyris Opobalsamum* of Forskal; but fresh specimens and recent observations are required to distinguish whether this is different from the *Balessan* of Bruce. Other species which are found in the Peninsula of India and are *spinescent*, used to be included under it, but are considered distinct by Dr. Arnott, who does not now unite them with *Protium* (as in the Prod. Fl. Ind. Penins.) from which indeed they differ much in habit.

The *Balessan* of Bruce was found by him at Azab, and said to extend to the straits of Bab-el-Mandeb. Gerloch found it at Bederhunin, a village between Mecca and Medina. Forskal found his Opobalsamum at Haes in Arabia Felix. At Aden it is called Beshan. Dr. Roth, in the Appendix to Harris' Abyssinia (ii. p, 144) mentions B. Opobalsamum as occuring in the Adel country and the jungles of the Hawash along with the Myrrh tree. The bark when wounded exudes the fragrant and far-famed Balsam, which has been called Balm of Gilead, but which seems to have been only cultivated in Palestine near the town of Jericho. It is now never obtainable in Europe in a pure state, and therefore seldom if ever employed medicinally, though it is no doubt possessed of stimulant properties.

Balsamodendron Myrrha (fig. 56.) Stem shrubby, arborescent; branches squarrose, spinescent Leaves ternate; leaflets obovate obtuse, obtusely tooth-letted at the apex, the lateral smooth. Fruit acuminate (Nees). Bark pale ash-gray, approaching white. Wood yellowish-white; both it and the bark have a peculiar odour. Leaves on short stalks Flowers unknown. Fruit ovate, smooth, brown somewhat larger than a pea; surmounted at the base by a four-toothed calyx, and supported on a very short stalk.

Dr. Royle has adopted the above description, as translated by his friend, Dr. Pereira, who has closely followed the account given by Nees von Esenbeck in the folio work *Beschreib Officin : Planzen*, where he says that his friend Dr. Ehrenberg collected from off this tree "*sehr schone Myrrhe*," and that the description is taken from the specimens of the plant collected by Ehrenberg at Gison, on the borders of Arabia Felix. Though it is not very probable, from modern information, that any large quantity of Myrrh is produced in Arabia, yet it is possible that some may be produced there, and from the same species of plant as that which yields the large quantities of Myrrh in Africa. Indeed, it is stated in the Appendix to Harris' Abyssinia (ii. 414), probably on the authority of Dr. Roth, that the "*Balsamodendron Myrrha* (*Karbeta* of the natives) grows on the borders of Efat and in the jungle of the Hawash, and in the Adel desert. The resinous gum called *Hofali* is collected for exportation. *B. Opobalsamum* (Beshan) grows commonly with the former, and grows even at Cape Aden." Unfortunately there are no specimens of either plant in the Herbarium collected by the embassy and sent to the India House. On examining the specimens in the British Museum of *B. Opobalsamum* or *B. Gileadense*, now united into one species, it appears to Dr. Royle that the specimens vary sufficiently to require careful examination and detailed description of good and complete specimens, before we can distinguish them as varieties, or determine them to belong to separate species; also whether the above *B. Myrrha* itself differs sufficiently to constitute a distinct species. The drawing of Nees, appears to Dr. Royle to resemble some of the Arabian specimens of *B. Opobalsamum* very closely. All are very distinct, both in foliage and inflorescence, from *B. Kataf* (v. 56, 1, 2, 3), of which a specimen collected by Forskal is in the British Museum. The species referred to by Dr. Roth are probably the same as the following.

Mr. Johnston, also, in his Travels through Adel to Abyssina (i. p. 249), in treating "of the tree that yields this useful drug, Myrrh," says "there are in the country of Adel two varieties, one a low, thorny, ragged-looking tree, with bright green leaves, trifoliate, and an undulating edge, is that which has been described by Ehrenberg." (v. the annexed figure, 56) "This produces the finest kind of Myrrh in our shops." This may be either the above *B. Myrrha* or one of the forms of *B. Opobalsamum*. "The other is a more leafy tree, if we may use the expression, and its appearance reminded me exceedingly of the common hawthorn of home, having the same largely serrated, dark-green leaves, growing in bunches of four or five, springing by several leaf-stalks from a common centre. The flowers are small, of a light-green colour, hanging in pairs beneath the leaves, and in size and shape resemble very much the flowers of our gooseberry-tree. It belongs to the Octandria Monogynia, the eight stamens being alternately long and short, the former corresponding to the four partial clefts in the edge of the one-leafed calyx. The fruit is a kind of berry, that when ripe easily throws off the dry shell in two pieces, and the two seeds it contains escape. The outer bark is thin, transparent, and easily detached; the inner, thick, woody. When wounded, a yellow turbid fluid (the gum-myrrh) immediately makes its appearance. Naturally, the gum exudes from cracks in the bark of the trunk near the root, and flows freely upon the stones immediately underneath. Artificially, it is obtained by bruises made with stones." This plant, judging from the specimens deposited by Mr. Johnston in the British Museum, corresponds exactly with one, also in the same collection, obtained by Mr. Salt in Abyssinia, *Balsamodendron Kua* of Mr. Brown's MSS. and of which Mr. Salt says, he obtained from it a gum much resembling the Myrrh.

Balsamodendron Africum, *Arnott.*—*Heudelotia africana.* Guill. et Per. This species, first found on the west of Africa, occurs also in the Abyssinian collection, having been found in the flat country of the Adel. Mr. Johnston immediately recognized it as one of the trees yielding gum-resin. The leaflets are like those of *B. Kua*, Br. It yields African Bdellium, or that imported into France from Guinea and the Senegal, according to M. Porrottet. M. Adanson, likewise, in his Travels in the Senegal, mentions it by the name of Niotout as producing Bdellium. It may also yield the Bdellium which is exported from the west coast of Africa. Dr. Maleolmson wrote to Dr. Royle that "Bdellium (of which he sends a specimen) is produced in Africa by a tree similar to the Myrtle. None is obtained in Arabia. It is very similar to Myrrh, and sometimes sold for it."

One kind of Bdellium is produced in India which Dr. Royle was informed was yielded by a tree called *googul* by the natives (v. Himal. Bot 177), and which is the *Amyris Commiphora* of Roxb. referred by Messrs. Wight and Arnott to Balsamsdendron. Dr. Walker, in his account of the drugs produced near Arungabad, states "a gum-resin, called by the natives *googool*, is produced by a tree (Dr. W. calls it Amyris Bdellium Roxb.) which grows in the neighbourhood of

Umber, a town twenty miles to the westward of Aurungabad. Roxburgh imagined that Googool was indentical with Myrrh." But the whole of the species of this genus require to be carefully examined from good and authentic specimens accompanied by their respective products, before the several doubts can be resolved. *Prop.* Myrrh is imported from Bombay. It is generally in pieces of irregular form and size, formed apparently by agglutinated tears, dry, and covered with a fine dust, commonly of a reddish-brown colour; brittle, fracture irregular, conchoidal, shining, with the surface apparently dotted with volatile oil, often varied, with opaque, whitish, semicircular marks; the smaller pieces angular shining, semi-transparent; taste bitter and aromatic, the smell peculiar and balsamic. Other kinds are also met with, probably derived from the same source, as it sometimes reaches this country with the different qualities intermixed (*Myrrh* in sorts) or when the finer pieces are picked out (Turkey or picked Myrrh). But when the process is adopted abroad, the inferior qualities may come separately or remain intermixed with other gums or resins, especially Bdellium, from the careless manner in which all are collected by the natives. The specimens brought by the Abyssinian embassy have *granular* fragments mixed with roundish tears; and some of a pale, even whitish, colour may be seen on the same piece of bark with ordinary coloured Myrrh. The specimens which have not been exposed to the air, are darker coloured, moister, and of a more powerful and agreeable smell.

Indian Bdellium is sometimes sold for and considered as an inferior kind of Myrrh. It is in roundish pieces of a dull dark-red colour, more moist than Myrrh, and not brittle like it, softening even with the heat of the hand; bitter and a little acrid in taste, with a less agreeable odour. It often has portions of the birch-like bark adhering to it. Myrrh, when heated, softens, then burns partially, leaving a black spongy ash. Triturated with water, it forms an emulsion: the Alcoholic tincture is rendered opaque on the addition of water. It is a Gum-resin with volatile Oil, and salts of several acids combined with Potash and Lime. The Gum, about 63 per cent., consists of two kinds, one-half being *Bassorin* or insoluble, and the remainder *Arabin*, or soluble Gum. This being dissolved in water, readily suspends the Resin and Oil. The Resin, about 28 per cent., is also of two kinds, one soft, odorous, and soluble in ether, while the other is hard, without odour, soluble in alkalis. The volatile Oil, about 2·5 per cent., passes over if distilled with water; it is at first without colour, but becomes yellowish, has the odour and taste of Myrrh, is soluble in Alcohol, Ether, and the fixed Oils. Upon it and the Resin the properties of Myrrh chiefly depend. *Action. Uses.* Stomachic, Excitant, Stimulant Expectorant, Emmenagogue, *D.* gr. x to xxx. but usually united with tonics or with purgatives, as Aloes.—*Royle.* The sort met with in India, and brought from the Arabian and African Coasts, is in large opaque pieces, generally covered with a brownish white powder. An inferior kind of Myrrh is also imported from the above places, and termed in India Bysabole. It has a great resemblance to Bdellium, for which it is not unfrequently mistaken. Myrrh is largely imported into Bombay, and is chiefly re-exported to England.—*Faulkner.*

(5546) MYROBALANS. This is a name applied to the almond-like kernels of a nut or dried fruit looking like a plum, of which there are several sorts known in the East. They are the produce of various species of *Terminalia*: as *T. Bellerica*, *T. Chebula*, *T. citrina*, and *T. angustifolia.* They vary from the size of olives to that of gall nuts, and have a rough, bitter, and unpleasant taste. Many of the trees of this tribe, which are all natives of the tropical regions of Asia, Africa, and America, are used for tanning, and some for dyeing. They are highly valued by dyers, creating, when mixed with alum a durable dark-brown yellow. Myrobalans fetch in the Bombay market 8*s.* to 26*s.* the Surat candy of 821 lbs. The bark and leaves of *T. Catappa* yield a black pigment, with which Indian ink is made; the seeds are eaten like almonds. A milky juice is said to flow from *T. angustifolia*, which when dried, is fragrant, and, resembling Benzoin, is used as a kind of incense in the Catholic churches in the Mauritius. The fruit of *T. Bellerica*, and of *T. Chebula*, both useful timber-trees, indigenous to the East Indies, are used medicinally as a tonic and astringent. One hundred and seventeen cwts. of Myrobalans were shipped from Ceylon in 1845. The annual imports of Myrobalans into Hull, amount to about 1600 cwts. The quantity which arrived at Liverpool was 185 tons in 1846, and 851 tons in 1850; 27,212 bags in 1851, and 19,946 bags in 1852; they came from Calcutta and Bombay, and are used for dyeing yellow and black. The price in January 1853 was 6*s.* to 12s. per cwt. The average annual imports into the United Kingdom may be taken at 1200 tons. Myrobalana is also the English name given by Lindley to the natural order *Combretaceæ*, which yields these fruits. [COMBRETACEÆ; EMBLICA.] (Simmonds, *Commercial Products of the Vegetable Kingdom.*)—*Eng. Cyc.* This fruit of several East Indian trees, is used in India as a substitute for galls. When ripe, the fruit is pear-shaped, deeply wrinkled, and of a brownish yellow colour: it weighs from 70 to 100 grains. The husk contains the whole of the astringent matter, some mucilage, and a brownish yellow colouring substance, which is used in India for dyeing yellow. The husk is easily separated by bruising the nut, which it encloses. The tannin of myrobalans differs slightly from that of gall. Gallic acid is also present in rather large proportion. The price of myrobalans in June 1852 was quoted at from 6*l.* to 10*l.* per ton. The *Myrobalans* of commerce yielded by *Terminalia chebula*, *belerica* and *citrina* (called also Gallnuts) are oval fruits of a dingy yellow colour, containing much tannin ; hence, they are useful to the tanner as well as the dyer. With alum, this dye yields a good durable yellow, and with salts of iron, a black colour, little inferior to that produced by Oak Galls. The Myrobolans although a very common dyeing and tanning material of this country from time immemorial, have not been many years introduced into English commerce, but so useful have they been found, that they have become a very important article of trade, and the consumption is now fully 2000 tons annually (Archer) —*Tomlinson.* On this subject, the Canara Local Committee observes as follows :— " During the last season a sudden demand " arose for the Gallnut, and large profits were " made by the persons who collected it from the " jungles. The exports for five years have been " as follows :"—

Fuslies.	Quantity.		Value.		
	Candies.	Mds.	Rs.	As.	P.
Fusly 1256.........	207	3	918	,,	,,
1260.........	380	16	1877	,,	,,
1261	537	19	2860	,,	,,
1262.........	530	17	2614	,,	,,
1263.........	2154	4	3029	,,	,,

All the three Myrobolans are to be met with in many parts of lower India. In Bengal they grow in abundance. In Java we are told by Buntins, (1) that the Dutch were in the habit of employing the Embic and Beleric sorts daily in their hospitals, in dysenteric, and bilious affections.—*M. E. J. R. Ainslie.*

Har, *Harra*, from Terminalia chebula, and other species, three in number, comprise all the discarded myrobalans of our old pharmacopæas. The myrobalans as brought into Cashmere from Delhee and Harowtee, Hindusthan and the Dukhan, are of four kinds namely :

Gural harra.—Astringent and purgative : used in mesalihs : given in medicine to children : four seers for one rupee.

Juwal harra.—Used in the same way : eight seers for one rupee.

Chaipel harra, used only in dyeing, ten seers for one rupee. The whole are much used in dyeing. According to the size of the myrobalan its value augments, so that a very large one may be worth one hundred rupees or more, the natives believing that the very large ones have the virtue of causing purging by being merely retained in the hands—*Gen. Med. Top. p.* 136. The Har or Harra, is, says Dr. Irvine, one among the articles of the native materia medica than which no one is more vaunted. It is considered to possess wonderful general deobstruent and purgative qualities &c. &c., while those who thus belaud it, are apparently not aware that this is the chebulic myrobalan (Terminalia chebula) of English pharmacopæias of the sixteenth century and long since deservedly neglected.—*Gen. Med. Top. p.* 153.

(5547) MYROBALAN, BELLERIC. TERMINALIA BELLERICA. Roxb.

Beleyluj, ARAB.
Booloo, CYNG'
Bella, DUK.
Behevra, Beeda, HIND. GUZ.
Belelah, Belegleh, PERS.
Behira, Veebitaka, SANS.
Tanikai, TAM,

The fruit of the Belleric Myrobalan, in its dried state, is little larger than a gall-nut, but not so regular in shape, of a dirty brown colour, and astringent taste. It is supposed to be similar in its properties to the Chebulic Myrobalan, but in a much weaker degree. It is much used in India as the basis of several colours, and also in medicine. Small quantities have of late years been exported from Bombay to England.—*Faulkner.* This article is sometimes used by the natives in its dried state in cases requiring slight astringents. The large tree which produces it, is common in Mysore, where it is called Tari ; and hence the botanical name (Myrobolanus Taria) given to it by Dr. Buchanan. It would appear to be the Tani of Rheede.—*Ainslie's Mat. Med. p.* 28. Belleric Myrobalan fruit is esteemed medicinal by the Burmese, and is dried and sold among the drugs. The tree is indigenous, but not very abundant.—*Mason.*

(5548) MYROBALAN, BLACK, OR INDIAN.

Heleclaj Aswad, ABAB.
Zengi-har, BENG.
Heinuz, Hemuj, GUZ. H.
Heleelah Secah, PERS.
Kurkadaga, SANS.
Sinbgi, TAM.

Is the unripe dried fruit of the *Terminalia chebula.* It is about the size of a pistachio nut and of a deep black colour, oblong, pointed at both ends, slender, and has scarcely the rudiment of the nut. It is used by the natives of India as a brisk purge ; and also as a dye. In Bengal and in most parts of the Western Presidency, they are grown in abundance. They are largely exported from Bombay to the Arabian and Persian Gulfs.—*Faulkner.*

(5549) MYROBALAN, CHEBULIC. COUNTRY GALLS. Terminalia Chebula, Willd.

Helecluj Kabulee, ARAB.
Araloo, CYNG.
Huldah, DUK.
Hurda, HAR, HAR,
Humbether GUZ. HIND.
Heleelah—kilan, PERS.
Haritaka, SANS.
Kadukai, TAM.
Carakaia, TEL.

In its dried state, it is about the size of a large Spanish olive, of an oblong ovate shape, yellow brown colour, and is marked with edges and furrows alternately. The tree (*Terminalia chebula*), which yields this fruit, is common in the Mysore country, Bengal, and in some parts of the Western Presidency. This fruit is infinitely more astringent than the preceding, and is on that account, much more extensively used by the natives in their arts and manufactures. They are exported from Bombay to London and Liverpool in large quantities.—*Faulkner.* This species is infinitely more astringent than the preceding, and it would appear by some experiments made by Dr. Roxburgh, that it is even more so than the Aleppo Galls. Kadukai well rubbed in conjunction with Galls and Cuttacamboo (of each equal parts) is considered by the Vyteans as an excellent external application in the apthous affections of children, and adults, the last of which is a most dangerous disease amongst the Native Indians. The tree which produces the Kadukai is common in Mysore, where it is called Arulay, and hence the Botanical name (Myrobolanus) given to it by Dr.Buchanan.—*Ainslie's Mat. Med.*

(5550) MYROBALAN, CITRINE. MYROBOLANUS CITRINA.

Alay-gara, TAM.
Harra, Harva, GUZ. H.
Liba, SANS.

The Citrine Myrobalan (*Terminalia citrina*), is ranked among the fruits; it is about the size of a French plum, and is often made into pickle, and when green, is used as a gentle purgative. It is frequently met with in most parts of Lower India. This fruit grows in Canara, it is not much prized and is generally made into pickle.—*Ainslie.*

(5551) MYROBALAN EMBLIC. EMBLICA (OR PHYLLANTHUS) OFFICINALIS. Phyllanthus Emblica, *Linn.*

Amla Anola, BENG.
Cayboung Ngot, Hac-min-sau, COCH-CHIN.
Amla, Anvelcutty, Aoonla Aunwera, GUZ. HIND.
Awusadanelli, CYNG.
Aoonla, Amlej, DUK.
Amleh, PERS.
Amalaka, Amrita, SANS.
Nelliekai, TAM.
Woosheerikaia, TEL.

The Emblic Myrobalan in its dried state, is about the size of a small marble, of a dirty, dark-brown colour, and irregular surface, possessing a considerable degree of astringency. It is to be met with in most parts of lower India. In Bengal they are grown in abundance. It is reckoned among the Indian fruits, and in its green state, is frequently made into preserve and pickle; it is also used in medicine.—*Faulkner.* In its dried state it is with other articles of similar qualities, made into a cooling and opening Ptisan. The tree which produces this article is the Niliea-narum of the Hort. Mal. and the Boa Malacca of the Malays.—*Ains. Mat. Med. p.* 29.

(5552) MYROSPERMUM, a genus of plants belonging to the natural order *Amyridaceæ.* It has a 5-toothed campanulate calyx; 5 petals, the upper one largest; stamens 10, distinct; ovary stipitate, oblong, membranous, with 2-6-ovules; legume with a winged stalk, terminating in an oblique indehiscent 1-celled 1-2-seeded samara. The species are trees with dotted leaves.—*Eng. Cyc.*

(5553) MYROSPERMUM. PERUIFERUM. (Myroxylon Peruiferum Linnæus), Balsam of Peru Tree. The stem of this plant yields the Balsam of Peru. It has a thick smooth straight trunk with a gray coarse bark, which is filled with resin. By distillation with water it yields a volatile oil. By exposure to the air it hardens, and is then termed Opobalsamum Siccum, which must not be confounded with the true Opobalsamum. Balsam of Tolu is also sometimes called Opobalsamum.—*Eng. Cyc.*

(5554) MYRTACEÆ, *Myrtle-Blooms,* Polypetalous Exogens, forming a very extensive and important natural order of Plants, exclusively inhabiting warm countries, and in all cases either shrubs or trees, an herbaceous form of the order being unknown. The most northern station of the species is the south of Europe, where the common Myrtle grows apparently wild. If this plant is taken as the type of the order, it might be said to consist of aromatic plants with opposite leaves, dotted with transparent oil-cysts, bearing icosandrous monogynous polypetalous flowers, succeeded by an inferior succulent fruit; but this is the character rather of a section of the order than of *Myrtaceæ* considered as a whole. In this division are however included nearly all the species employed for the use of man. Among the table-fruits of the tropics are—the Guava, yielded by different species of *Psidium*; the Rose-Apple and Jamrosade, produced by *Eugenia Malaccensis* and *E. Jambos*: of spices, Cloves are the flower-buds of *Caryophyllus aromaticus*; and Allspice is the dried berries of *Eugenia Pimenta*; all which are obtained from the plants belonging to the same section as the Common Myrtle; the aromatic fruits of that plant were indeed used as a spice before Cloves and Allspice became common.

The deviations that take place from the typical structure of the order consist partly in the fruit being dry and capsular instead of fleshy and indehiscent, and partly in the organisation of the interior of the fruit being educed to a state of great simplicity; besides which the leaves are often alternate instead of opposite. Some of the species have no corolla, and there is in many cases a very singular tendency to consolidate the floral organs of all kinds.

The species with capsular fruit are principally found in Australia, where, in the form of *Eucalyptus* and *Leptospermum*, they constitute one of the most striking features of the vegetation These plants abound in a powerful astringent secretion, chiefly found in their bark, on which account they are found valuable for the tanner's purposes; while the aromatic principles is also abundantly secreted in other cases, as, for example, in *Melaleuca Cajeput*, from which the green stimulating oil of the Cajeput is procured. It is more particularly among these species that anomalous conditions of the floral organ occur. In *Eucalyptus* there is no corolla, and the segments of the calyx are so completely united to each other as to form a fleshy cap, thrown off by the flowers when the time arrives for extricating the stamens. In *Melaleuca*, *Calothamnus*, and several others, the stamens are united to each other by their filaments, so as to form showy, petal-like, fringed expansions; and in *Eudesmia* the petals themselves are united into a cap, thrown off upon the expansion of the flower.

The most singular form of *Myrtaceæ* is that which derives its name from an Australian plant, called *Chamælaucium*, in which the interior of the ovary contains but one cell, with from two to five ovules rising up obliquely from its base. These plants are all small heath-like shrubs, having in the majority of cases the edge of the petals prolonged into long and delicate fringes. Such plants are extremely abundant on the west coast of Australia, where they form one of the most striking characters of the Flora. *Punica Granatum*, the Pomegranate-Tree, is a most anomalous form of *Myrtaceæ*, remarkable for an almost total absence of transparent dotting, and consequently of aromatic qualities; and having a fruit consisting of two whorls of carpeds compacted together into an inferior ovary, the interior of which becomes altered and distended so much after the flower has fallen off, that the fruit is nothing but a collection of cavities filled with seeds, and having no apparent relation to each other.

The genus *Caryophyllus* has the following characters:—Tube of the calyx cylindrical; limb 4-parted; petals 4, adhering by their ends in a sort of calypra; stamens distinct, arranged in 4 parcels in a quadrangular fleshy hollow near the teeth of the calyx; ovary 2-celled; ovules about 20 in each cell: berry 1-2-celled, 1-2-seeded; seeds cylindrical or half-ovate; cotyledons thick, fleshy convex externally, sinuous in various ways internally.

C. aromaticus, the Clove-Tree, is a native of the Molucca Islands. It is a moderately-sized tree, with leaves opposite and decussate, persistent, somewhat coriaceous and shining, minutely punctuated, about 4 inches long, ovate-lanceolate, more or less acute, quite entire, pale beneath, tapering gradually at the base into a slender footstalk which is almost 2 inches long. The cloves of the shops are the dried compressed flower-buds of this tree.—*Eng. Cyc.*

(5555) MYRTUS (Μύρτος), a genus of Plants, the type of the natural order *Myrtaceæ*. It has the calyx-tube somewhat globose, with the limb 5- or very rarely 4-partite; the petals 5, or very rarely 4; the stamens distinct; the berry 2- or 3-celled, somewhat globose, crowned with the segments of the calyx; several seeds in each cell, or very rarely solitary; uniform, with a bony testa; the embryo curved; cotyledons semi-cylindrical, very short, the radicle twice the length of the cotyledons. The species are shrubs with opposite quite entire pellucid dotted leaves; peduncles axillary, 1- or rarely 3-flowered.—*Eng. Cyc.*

(5556) MYRTUS COMMUNIS, Common Myrtle, has solitary 1-flowered pedicels about the length of the leaves, bearing 2 linear bracteoles under the flowers; the calyx 5-cleft; the leaves ovate, lanceolate, or acute. This beautiful plant is a native of the south of Europe; it is found wild in France, about Marseilles, and extends from that city along the sea-coast to Genoa, and throughout Italy. In these districts it forms thickets which sometimes grow within reach of the spray of the sea. This plant has been in all ages a great favourite in Europe. It was called by the Greeks Μύρτος. Μυρσίνη is the name under which Hippocrates refers to this plant. ('Morb. Mul.,' i. 599.) Theophrastus also uses this word, and Μυρτίνη and Μυρτίς, in speaking of the Myrtle. The Romans knew this plant by the name of Myrtus. (Pliny, 12-13.) This name has been adopted in most European languages. It is Mirto in Italian and Spanish; Myrte in German; Myrter in Danish; Myrten in Swedish; Mirte in French; Mirta in Portuguese. The leaves of the Myrtle, like the whole order, contain a volatile oil which possesses medicinal properties, and they were used as stimulants by the ancients. The buds and berries of this plant also contain volatile oil, and were used by the Romans as a spice, and are at this day in Tuscany employed as a substitute for pepper. The Tuscans also prepare a kind of wine from the Myrtle called Myrtidanum. The berries are used at the present day in Greece as a remedy in the diarrhœa of little children. The mode of administering them is to soak them in red wine. The flowers of the Myrtle have an agreeable scent, and when distilled they form the perfume sold in France under the name of Eau d'Ange. In addition to the volatile oil the Myrtle contains tannin, so that in medicine its various parts have an astringent action, and have been used for this purpose. In Greece, Italy, and the south of France, the bark is used for tanning. The varieties are the Gold-Striped Broad-Leaved Myrtle, Broad-Leaved Jew's Myrtle, Gold-Striped-Leaved Orange-Myrtle, Silver-Striped Italian Myrtle, Striped Box-Leaved Myrtle, Silver-Striped Rosemary-Leaved Myrtle, Silver-Striped Nutmeg Myrtle, Cockscomb or Bird's-Nest Myrtle, Spotted-Leaved Myrtle. About 40 other specie of Myrtle besides those of the old genus *Myrtus*, now referred to the genera *Myrica*, *Syzygium*, *Eugenia*, &c., have been described. None of them yield products used in arts or medicine, and only a few of them have been cultivated.—*Eng. Cyc.*

(5557) MYRTUS NUMMULARIA is a creeping species found at the Straits of Magalhæns; and *M. myrsinoides*, a native of the colder parts of Peru, would probably be found to be half-hardy in England (London, *Arboretum Bri- annicum*; Fraas, *Synopsis Floræ Classicæ*; Burnett, *Outlines of Botany*; Lindley, *Flora Medica*. —*Eng. Cyc.*

(5558) MYRTUS SPECTABILIS, M. TOMENTOSA.

(5559) MYRTUS TOMENTOSA, is a native f Cochin China. It is a handsome shrub, and as been found to grow well against walls in the outh of England.—*Eng. Cyc.*

(5560) MYTILIDÆ, a family of Lamellibran- hiate *Mollusca*. It includes the species referred y Linnæus to the genus *Mytilus*. Mr. G. B. owerby ('Genera'), after remarking that e Linnæan genus *Mytilus*, on account of s principal character being its want of hinge teeth, onsists of several forms that are widely distinct om each other, and which have well served as e types of several Lamarckian genera, such as *cicula*, *Modiola*, *Anodon*, and others, in connec- on with the present genus, which deservedly tains the name of *Mytilus*, both on account of s form and the priority of its claim, proceeds observe that the other genera which have been nited with it but from which it appears neces- ry to distinguish it because of a certain degree general resemblance, are *Modiola* and *Lithodamus*: from *Anodon* and *Avicula*, together with Lamarck's *Meleagrina*, it is, he adds, obviously distinct: whilst one character—namely, the pointed terminal umbones—serves to distinguish it from *Modiola* and *Lithodomus*.—*Eng. Cyc.*

(5561) MYTILUS. This genus is abundant on most rocky coasts, where the species are to be found moored by their coarse filamentous byssus, generally to such rocks or other submarine bodies as are exposed at some periods of the tide where tides exist, and covered by the sea at high water. Mr. G. B. Sowerby does not think that, after being once attached, they habitually disengage themselves, though it appears to him probable that, when disengaged by the force of the sea, they may live for some time without being in any manner, affixed. The species are numerous, and most of them are used as food; but they should be eaten with caution, for serious illness and even death have insued from a meal made on some of them. The byssus, or beard, as it is popularly called, should be carefully cleared away, and they should be particularly avoided when cholera is about, or even when diarrhœa is prevalent.—*Eng. Cyc.*

(5562) MYTILUS EDULIS, the Common Salt-Water Muscle. This species is too well known to require description: the shell, is strong. When freed from the epidermis and polished, the under surface of the external parts of the shell is exposed, and is of a deep blue. In this state it is often offered for sale at watering places. The inside of the valves is white with a dark rim. The Common Edible Muscle is found in extensive beds below low-water mark, and also at a greater depth. Rocks and stones between high-water marks are also covered with them.

N.

(5563) NAA. A very hard, fine, close-grained, d very ponderous Ceylon wood.

(5564) NADULEE. A stone engraved with erse of the koran, and suspended as a charm nd the necks of children.—*Herklots.*

(5565) NAGEESA HIND. There is much pute amongst oriental scholars about the wood gcesa; the Bombay philologists refer it to a cies of *Garcinia*, whilst the pundits on the cutta side of India consider it to be *Mesua* *ra.* Throughout his travels in India, Dr. oker was struck with the undue reliance plac on native names of plants, and information of ds: and the pertinacity with which each st adhered to his own crotchet as to the application of terms to natural objects, and their pronunciation. It is a very prevalent, erroneous impression, that savage and half-civilised people have an accurate knowledge of objects of natural history, and a uniform nomenclature for them. —*Hooker Him. Jour. Vol.* II. *p.* 328.

(5566) NAGEIA PATRANJEVA: POOTRA JEEVI, TELING Pongalam: Rheed Pootrungeira Pitanjia. A native of various mountainous countries of Coramandel and Hindoostan, where it grows to be a large timber tree with an erect straight trunk and a large spreading shady head composed of innumerable expanding branches, with bifarious branchlets. Flowering time March and April and the fruit ripening in January.

The wood is white, close grained, and very hard. —*Rhode M.S.S.*

(5567) NAGKESUR, Mesua ferrea. The root of the tree is used: considered astringent and refrigerant: one tola is taken internally: is applied externally in cynanche.—*Genl. Med. Top. p.* 147.

(5568) NAIGRE SEED, is not known at Madras, it is an article of export from Malabar: it is probably the name of the seed of Pongamia glabra.

(5569) NAIA, Laurenti's name for a genus of highly venomous Serpents, to which the species of *Uræus* and *Aspis* of Wagler belong. This form appears to be confined to the Old World. The Asiatic species *Coluber Naja* of Linnæus; *C. cæcus* of Gmelin (?); *Vipera Naja* of Daudin; *Naja tripudians* of Merrem; *N lutescens* of Laurenti; Cobra de Capello (adder with a hood) of the Asiatic Portuguese; Serpent a Lunettes of the French; Nag and Chinta Nagoo of the natives; and Spectacles-Snake of the English, may be considered as the type of the genus. It has the following characters: —Head with nine plates behind, broad; neck very expansile, covering the head like a hood: tail round. (Gray.) The expansion of the neck and upper part of the body is effected by the anterior ribs, which the animal has the power of raising and bringing forward so as to dilate that portion into a disc more or less large. When this disc is thus dilated in the *Naia tripudians*, it presents on the back part of it no bad representation of a pair of spectacles, or rather barnacles, reversed, for there is no trace of the lateral pieces by which spectacles are attached to the head of the wearer. The animal is brown above, and bluish-white beneath. The following cuts will convey some idea of the form of this snake, with the hood or disc expanded. Colonel Briggs informs us that this active and deadly serpent is sometimes worshipped in temples in India, where it is pampered with milk and sugar by the priests, and he notices it as a surprising instance of the effect of kind treatment in subduing the most irritable spirits. "The Hindus," says the Colonel, in continuation, "have a notion that the sagacity and the long-cherished malice of this worm are equal to that of man. I have seen them come out from their holes in the temples, when a pipe has been played to them, and feed out of the hand as tamely as any domestic animal; and it is when in this state of docility, so opposite to their shy but impetuous nature, the common people believe that the Deity has condescended to adopt that form. It seems probably that this hooded snake was the dragon of the heathen worship; and the shape of its head and its activity when in a state of excitement probably gave rise to the fable of its being winged." It is pretended that the root of the *Ophiorrhiza mungos* is a specific against the bite of this serpent. The priests and jugglers however, who make them dance to astonish or amuse the people, make all sure, there is little doubt, by extracting the poison-fangs. This formidable species, or at least some species of hooded snake, according to the records of travellers, grows to a considerable length. Captain Percival gives the following account of its size and habits, in his 'Account of the Island of Ceylon,' 5to, 1805:—"The Cobra Capello, or Hooded Snake, is found here from six to fifteen feet long. Its bite is mortal. The natives find the herb pointed out by the ichneumon a remedy, if timely applied. When enraged and preparing to attack, it raises its head and body to the height of three or four feet in a spiral manner, while at the same time the remaining part of the body is coiled up to accelerate and give force to the spring. At this instant it distends from its head a membrane in the form of a hood, from which it receives its name. This membrane lies along the forehead and the sides of the neck, and is almost imperceptible till the animal gets into a state of irritation and is about to attack his foe. When the hood is erected it completely alters the appearance of the head, and discloses a curious streak in the shape of a pair of spectacles, and sometimes of a horse shoe. The extension of this membrane seems intended by Providence to give warning to all those within this animal's reach that he is preparing to attack them. Without this signal he would be very dangerous indeed, as his motions afterwards are too rapid to be avoided. I have more than once been an eye-witness to instances where the fatal bite of this snake was escaped from merely by the object of his vengeance timely observing his preparations. One remarkable characteristic of these dangerous serpents is their fondness fo music. Even when newly caught they seem to listen with pleasure to the notes, and even to writhe themselves into attitudes. The Indian jugglers improve greatly on this instinct, and after taming them by degrees, instruct them even to keep time to their flageolet." The larges Cobra de Capello seen by Dr. Davy in Ceylon was nearly six feet long; and he adds that th general length is between two and four feet The colour varied: those of a light colour wer called high-caste snakes by the natives, and thos of a dark colour low-caste. "The natives," say Dr. Davy, "in general rather venerate this snak than dread it. They conceive that it belongs t another world, and that when it appears in th it is merely as a visitor; they imagine that possesses great power, that it is somewhat akin t the gods, and greatly superior to man. consequence they superstitiously refrain fro killing it, and always avoid it, if possible. Eve when they find one in their house, they will n kill it, but, putting it into a bag, throw it in water. They believe that this snake has a good a generous disposition, and that it will do no harm to man, unless provoked." Dr. Davy gives a pleasing picture of the irritations and soothings with which the snake-charmers excite and allay the temper of this serpent. He records several instances of the operation of the poison, the first arising from a serpent found in a bag floating down the Kalang-ganga. It was about five feet long, and about six inches in circumference in the broadest part. This snake bit a hen, fixing its fangs in the skin covering the lower part of the eft pectoral muscle, and keeping its hold about wo or three seconds, when Dr. Davy succeeded n shaking it off. The hen, which at first seemed o be little affected, died eight hours after she vas bitten. ('An Account of the Interior of Ceylon,' &c., by John Davy, M.D., F.R.S., 4to, London, 1821.) Several Cobras have been kept live in the Zoological Gardens, Regent's Park. One of these creatures bit one of the keepers on he nose whilst he was playing with it. The man died in a few hours after. The Arabs who ccompanied the Hippopotamus had the power f snake-charming; and on several occasions hese fearful reptiles were made to go through a ariety of performances by a lad not 'more than 0 or 12 years old.' There are several other pecies of *Naia*. Schlegel, in his essay on the Physiognomy of Serpents,' gives the following:—

Naia Haje.—The Aspis of antiquity. This the snake which is most frequently operad on by the snake-charmers of Egypt, where is found. [ASP.] It is worthy of observation ith reference to the contest in the presence Pharaoh between Moses and Aaron and e magicians of Egypt (Exodus, vii. 9,12), at it is stated, on good authority, that the odern Egyptian jugglers possess the power throwing the *N. Haje* into a state of talepsy, and rendering it stiff and immovele, in other words, changing it into a rod, by essing the nap with the fingers.

Nabalus Bungarus.—Is a rare species, inhabitg the islands of Java and Sumatra. It is the *ngarus* of Daudin.

Nabalus Curta.—A native of Australia. We e to Dr. Cantor, who has added so much our knowledge of the natural history of iatic serpents, the introduction of a new ius of hooded snakes, *Hamadryas*, which will obably find its proper place in the series as a -genus of *Naia*.

Hamadryas (Cantor). Head broad, subte, deplanate, with a short obtuse rostrum, ered above with 15 scuta; cheeks tumid; s large, prominent, pupil round; nostrils ely opened, within the confine of two scuta; e very ample, subundulated. Poison-fangs erior, behind which are the maxillary teeth. ck dilatable. Body thick, smooth, imbricated with smooth scales disposed in oblique rows. Tail short, covered with scuta and scutella, its apex acute.—*Cantor.*

H. ophiophagus (Cantor). Above olive-green, girt with black sagittal striæ; abdomen glaucous, marbled with black. The Hindustanee name is Sunkr Choar. It is a native of Bengal. Dr. Cantor thus describes the habits, the effect of the poison, and the history of this serpent:—"The *Hamadryas*, like the *Bungarus*, *Hydrus*, and *Hydrophis*, has a few maxillary teeth behind the poison-fangs, and thus, like the latter, connects the venomous serpents with isolated poison-fangs to the harmless, which possess a complete row of maxillary teeth. "Of the terrestrial venomous serpents, the *Bungarus* is chiefly characterised by a distribution of the teeth similar to that of the *Hamadryas*, which also partaking of the chief characteristic of the genus *Naja*, namely, that of forming a hood or disc, constitutes an immediate link between the genera *Bungarus* and *Naja*. "In consequence of the strong resemblance in the general appearance between the *Naja* and the *Hamadryas*, when first my attention became attracted to the latter, I thought I could refer this serpent to that genus; and it was not until I was able to examine a specimen whose poison-fangs were untouched (those of the first specimens I saw having been drawn by the natives, who are greatly afraid of this serpent), that I discovered the maxillary teeth behind the poison fangs.

"*H. ophiophagus* differs from the Naja *tripudians*:—1, By its maxillary teeth; 2, by the strongly-developed spines on the os occipitale inferius; 3, by the covering on the head; 4, by the integuments covering the abdominal surface of the tail; 5, by its colour; 6, by its size. According to the natives, the *Hamadryas* feeds chiefly upon other serpents: in one I dissected I found remains of a good-sized monitor, which fact may account for its arboreal habits, as I have in Bengal, along the banks of the rivers, observed numbers of those large lizards among the branches of trees watching for birds. "The power of abstaining from food, generally speaking, so characteristic of the Serpents, is but in a comparatively small degree possessed by this species; the most protracted starvation amounts to a period of about one month; while the *Vipera elegans*, the *Naia tripudians*, and the *Bungarus annularis*, have, without inconvenience, been confined in cages without any food for more than ten months. Two specimens of the *Hamadryas*, in my possession, were regularly fed by giving them a serpent, no matter whether venomous or not, every fortnight. As soon as this food is brought near the serpent begins to hiss loudly, and, expanding the hood, rises two or three feet; and retaining this attitude, as if to take a sure aim, watching the movements of the prey, darts upon it in the same manner as the *Naia tripudians* does. When the victim is killed by poison, and by degrees swallowed, the act is followed by a lethargic state, lasting for about twelve hours. Such of the other India venomous serpents, the habits of which I have had opportunity to study from life, show themselves much inclined to avoid other serpents, however ready they are to attack men or animals when provoked or driven by hunger; and I am not aware of any other of those serpents being recorded as preying upon its own kind. A short time ago however, during my sojourn at the Cape of Good Hope, I received from high authority the following fact, which throws a light upon the habits of the *Naja* of Southern Africa, one of which, when being captured, threw up the body of a *Vipera arietans* (*V. brachyurus*, Cuvier), which bore marks of having been submitted to the process of digestion. "The *Hamadryas*, like the greater number of Indian serpents, evinces a great partiality to water. With the exception of the Tree-Serpents (*Leptophina*, Bell), they all not only drink, but also moisten the tongue, which, as this organ is not situated immediately in the cavity of the mouth, become in the serpents two different acts. Specimens of this serpent in my possession changed the skin every third or fourth month, a process which takes place in all the Indian serpents several times during the year. The *Hamadryas* is very fierce, and is always ready not only to attack but to pursue when opposed; while the *Cophias*, the *Vipera*, the *Naja*, and the *Bungarus* merely defend themselves, which done, they always retreat, provided no further provocation is offered. The natives of India assert that individuals are found upwards of 12 feet in length, —a statement probably not exaggerated, as I have myself seen specimens from 8 to 10 feet in length, and from 6 to 8 inches in circumference, I have often heard it asserted that 'Cobras' (which name is naturally enough given to every hooded serpent) have been met of an enormous size, but I strongly doubt their belonging to the genus Naia; among a considerable number which have come under my observation, I never saw any exceeding 5 to 6 feet in length, while the common size is about 4 feet. Some time before I discovered the *Hamadryas*, I was favoured by J. W. Grant Esq., of the Hon. Company's Civil Service, with an interesting description of a gigantic hooded serpent he had observed in the upper provinces, and which, he remarked, was not a *Naja*. By inspection this gentleman denied the *Hamadryas* to be indentical with the above-mentioned. "The natives describe another hooded serpent, which is said to attain a much larger size than the *Hamadryas*, and which, to conclude from the vernacular name, Mony Choar," is perhaps another nearly allied species.

"The fresh poison of the *Hamadryas* is a pellucid tasteless fluid, in consistence like a thin solution of gum arabic in water; it reddens slightly litmus paper, which is also the case with the fresh poison of the *Cophias viridis*, *Vipera elegans*, *Naja tripudians*, *Bungarus annularis* and *Bungarus cœruleus*. When kept for some time it acts much stronger upon litmus; but after being kept it loses considerably, if not entirely, its deleterious effects.

"From a series of experiments upon living animals, the effects of this poison come nearest to those produced by that of the *Naja tripudians*, although it appears to act less quickly. The shortest period within which this poison proved fatal to a fowl was fourteen minutes, whilst a dog expired in two hours eighteen minutes after being bitten. It should however be observed that the experiments were made during the cold season of the year."—*Eng. Cyc.*

Nabalus Elaps.—Is a very large snake, but its country is unknown.

(5570) NAILS.

Spykers, Dut.
Clous, Fr.
Nagel, Spiker, Ger.
Keela, Meikh, Guz. Hind.
Chiodi, Chiovi, Aguti, It.
Pregos, Port.
Gwosdi, Rus.
Clavos, Sp.

Are small spikes of iron, copper, brass, &c. which, on being driven into wood, serve to bind or keep together several parts or pieces. The principal seats in England of this useful branch of the iron manufacture are at Birmingham, Bilstone, and Wolverhampton. Iron nails are largely made in Bombay, and are chiefly used in the construction of houses, sailing vessels, &c.—*Faulkner.*

(5571) NAK-CHIKARA. The leaves of a small plant found about Ajmeer, also imported from Delhi: are very hot, and a good sternutatory: three massee are given in pills, as a dose in colic, which is said to be thus speedily relieved.—*Genl. Med. Top. p.* 147.

(5572) NALAPANA KULINGOO, Curculigo orchioides.

(5573) NIMA QUASSIOIDES, (Hamilton.) *Syn.* Simaruba Quassioides, Don. This is a native of the Himalayas. It was discovered in Nipal by Dr. Hamilton, and is stated by Dr. Royle to exist in Turanda, on the banks of the Sutledge, in more than 31° of N. latitude. Dr. Royle has also met with it in valleys in Gurhwahl. In general appearance and intense bitterness this tree is too closely allied to the Simarubeæ to permit their separation. The wood of this tree is light coloured and very bitter, and although it has not as yet been subjected to experiment, we are led from analogy to entertain the most confident opinion of its proving a perfect substitute for the West Indian article.—*O'Shaughnessy, page* 269.

(5574) NAMEDE. A rather hard, very fine, close-grained, heavy Ceylon wood.

(5575) NAMELUDDOOGOO.

Neemee ladogoo Tel.
Junglee shumbaloo, Hind.

(5576) NANDINA DOMESTICA. There is a plant, with red berries, which takes the place of our English holly. It is the *Nandina domestica*, and is called by the Chinese the "Teinchok," or sacred Bamboo. Large quantities of its branches are brought in from the country and hawked about the streets. Each of these branches is crowned with a large bunch of red berries, not very unlike those of the common holly, and, when contrasted with the dark, shining leaves, are singularly ornamental. It is used chiefly in the decoration of altars, not only in the temple, but also in private dwellings and in boats, for here every house and boat has its altar—and hence the name of "sacred Bamboo" which it bears.—*Fortune, page* 122.

(5577) NANKEEN, OF NANKIN.

Nankings linnen, Dut.
Toile de Nankin, Fr.
Nanking, Ger.
Nankeen, Guz. Hind.
Nanquino, It.
Nanquina, Sp.

A Chinese cotton cloth of either white, blue, or brownish-yellow colour. In point of strength and durability, it is unrivalled by any of the cotton fabrics of Europe. In some of the southern parts of Europe, the warmer parts of America, and the British settlements in Africa, Nankeen is worn by both sexes all the year round, and constitutes the principal article of attire. In England and India it is now almost disused. —*Faulkner.* This kind of cotton cloth is so named from Nanking, where the reddish threads were originally made. They are divided into company's of which there are three qualities, and narrow nankeens; the former are the finest and most esteemed. Nankeens are also manufactured in Canton and other parts of the empire, but the fabric is of an inferior quality. Those made in Canton still maintain their superiority in color and texture over the imitations of other countries. The price varies from $ 45 to $ 90 per hundred pieces. This cloth is extensively worn by the Chinese themselves, who usually dye it with indigo. The exportation is now trifling, and almost wholly to England, although small quantities find their way elsewhere. The duty, which was formerly a discriminating one, has been equalized under the new tariff, and includes nankeens and all other kind of native cotton cloths. —*Morrison.* The durable cotton cloth made in the central provinces, called Nan-keen by foreigners, is the chief produce of Chinese looms from Cotton, the aerial muslins so highly admired by the Hindus not being woven. The nankeen is generally exported without dyeing, but the people usually color it blue before making it into garments. The import of raw and manufactured cotton constitutes a large item in the foreign trade, but forms a small part of the native consumption. In preparing the cotton for spinning, it is cleaned and freed from knots by placing the string of a bow under the heap, and striking it with a beater; the recoil separates it into flocks without injuring the staple. *Williams' Middle Kingdom, Vol. II, page* 124. *Nankeens* were formerly sent abroad in considerable quantities, but instead of exporting their own fabrics, the Chinese now purchase cottons from their former customers to a large amount. There are few fabrics more durable than the nankeen, and it forms the principal material for cheap garments among the people and is more or less exported every year to England, Sydney and South America.—*Williams.*

(5578) NAPHTHA, ROCK OIL.

Neft, Arab.
Bitume de Judee, Fr.
Nuekteil Mittie-ke-teil, Guz. & Hind.
Kesoso no abra, Jav.
Minnia tanna, Mal.
Bhumi, tailum, Sans.
Mun tylum, Tam.
Boomie tylum, Tel.

An inflammable mineral substance, which is both a natural and artificial product. It is a fine, thin, volatile, colourless fluid which issues out of white, yellow, or black clays in Persia, Media, and other places; a similar liquid is obtained by the distillation of petroleum, caoutchouc, and pit coal in gasworks: the latter kinds have a penetrating and unpleasant odour. Naphtha dissolves the greater number of the essential oils, and the resins; and is extensively used for dissolving caoutchouc to render cloth water proof; with certain vegetable oils, it forms a good varnish, and for this purpose is sometimes substituted for turpentine. In Genoa it is used in the street lamps.—*Faulkner.* Naphtha is a compound of Carbon and Hydrogen, frequently found in the neighbourhood of coal-deposits, and in other parts of the earth. It contains 82.2 of carbon and 14·8 of hydrogen. It is a limpid or yellowish fluid, lighter than water, and hence called Mineral Oil Its specific gravity is 0·7 to 0·84. It hardens and changes to the substance called Petroleum on exposure to air. It may be obtained from Petroleum by heat, which causes it to pass off in vapour. Naphtha issues in large quantities from the earth in Persia and the Birman Empire. At Rangoon, on one of the branches of the river Irawaddy, there are upwards of 500 naphtha and petroleum wells, which afford annually 412,000 hogsheads. In the peninsula of Abcheran, on the western shore of the Caspian, naphtha rises through a marly soil in vapour, and is collected by sinking pits several yards in depth, into which the naphtha flows. There is an abundant spring near Amiana, in the Duchy of Parma. Mr. Dana says that in the United States it was formerly collected for sale by the Seneca and other Indians; the petroleum is therefore commonly called Genesee or Seneca Oil, under which name it is sold in the market. Petroleum is used as lamp-oil in Birma, and when mixed with earth or ashes as fuel. Naphtha is used both for fuel and light by the inhabitants of Bakou, on the Caspian. The vapour is made to pass through earthen tubes, and is inflamed as it passes out, and used in cooking. The spring at Amiana is used for illuminating the city of Genoa. Naphtha has been recently used as a medicine, and is found to be a good stimulant in some chronic diseases. It has been externally applied as a lotion in cutaneous affections. It is sometimes substituted for drying oil in making paints. It is also employed for preserving the metals of the alkalies potassium and sodium, which cannot be kept in contact with any substance containing oxygen. The Rangoon petroleum contains the compound Paraffine. This substance has also been obtained pure in a liquid form from the coal-pits of Derbyshire. It is used for the purpose of diminishing the friction of machinery as a substitute for sperm-oil. It is now obtained artificially from coal, and also in a solid form, from which candles are made. (Dana. *Manual of Mineralogy*; Gregory, *Handbook of Organic Chemistry.*)—*Eng. Cyc.* In our article ASPHALTUM a number of natural inflammable substances are enumerated, among which is *naphtha*, *rock oil*, or *petroleum*. The term naphtha is usually limited to the thinner and purer varieties of rock oil; and petroleum to the darker and more viscid liquids. They are mixtures of various hydrocarbons; but in its purest form naphtha may be said to consist of C_5H_6, and yielding a vapour of the density of 2·8. Such a hydrocarbon is obtained as a natural product at Baku on the shores of the Caspian, where the soil is a clayey marl impregnated with naphtha. It is also procured from Monte Ciaro, near Piacenza in Italy, by sinking pits in the horizontal beds of argillite, which gradually fill with water; and the naphtha oozes out of the rock and floats upon the surface, from which it is skimmed off. Naphtha may also be obtained by the distillation of petroleum, and it is one of the results of the destructive distillation of coal, it often passes with the gas to the distant parts of the apparatus, and may be found in gas-meters and gas-meter tanks, and even in the mains. Carefully rectified naphtha, whether from natural or artificial sources, appears to possess similar properties. The sp. gr. of the purest Persian and Italian naphtha is said to vary from 0·750 to 0·760, while that of coal-naphtha may be ·820 or higher. The odour of the natural naphtha is bituminous but not unpleasant; that of coal is penetrating and disagreeable. It does not congeal at zero. It ignites readily, and burns with a voluminous sooty flame. It is not soluble in water, although it communicates its odour to that fluid. It dissolves in absolute alcohol, in ether and the oils. The boiling-point varies in different specimens from 320° to 365°. It dissolves caoutchouc, and hence its value in the manufacture of water-proof clothing.—*Tomlinson.*

(5579) NAR OR NUL, of Bengal, is described as being employed for making the mats known by the name of Durma, which are formed of the stalks split open. Dr. Stocks informed Dr. Royle that in Sindh the grass called *Sur*, which perhaps is *Arundo karka* has its culms, *sur jo kanee*, made into chairs, and its flower-stalks beaten to form the fibres called *moonyah*. These are made into string or twine (*moonyah jo naree*), and into ropes (*moonyah jo russa*).—*Royle.*

(5580) NARAVELIA ZEYLANICA. CEYLONESE NARAVELIA. In the southern provinces of Tenasserim, a handsome flowered climbing plant of the genus naravelia, belonging to the ranunculus tribe, is occasionally seen.—*Mason.*

(5581) NARCISSUS. AMARYLLIDACEÆ.—These flowers are of easy culture in a light soil, though they throw out a profusion of leaves, they rarely blossom.—*Riddell.*

(5582) NARDOSTACHYS, a genus of Plants belonging to the natural order *Valerianaceæ*. The limb of the calyx is 5-parted; the lobes ovate, oblong, acute, leafy, somewhat toothed and permanent; the corolla is regular, ecalcarate, obtusely 5-lobed and bearded in the throat; there are 4 stamens, which are attached to the bottom of the corolla. The species are herbs with sweet-scented perennial roots, which are beset with erect fibres at the neck. —*Eng. Cyc.*

(5583) NARDASTACHYS GRANDIFLORA has a glabrous stem, oblong glabrous leaves, with solitary terminal flowers; the capsule is downy, and the lobes of the calyx evidently denticulated. It is a native of Nepaul and Kumaon. (Lindley, *Flora Medica.*)—*Eng. Cyc.*

(5584) NARDOSTACHYS JATAMANSI, (see Royle's Illust. p. 243. t. 54. *Syn.* VALERIANA JATAMANSI. (Jones As. Res. ii. p. 405. iv. p. 109.) Patrinia Jatamansi, *Don.* Ναρδος ινδικη. Dioscorides—*Indian spikenard.*

Sumbul Hindee, VERN.
Sumbool-ul-teb, ARAB.
Balchur, HIND.

A native of the mountains of the north of India, at very great elevations. The roots of the Jatamansi are brought down from the mountains in large quantities. Considerable discussion has arisen as to the true origin of the celebrated spikenard of the ancients, but the labours of Sir William Jones and Professor Royle leave no longer any reasonable doubts as to its being truly referrible to this article. The root is of a blackish colour, and resembles the bushy tail of the ermine. Its odour is strong and fragrant, and is much esteemed by all Eastern nations. For medicinal purposes experience leads to the belief that the species is a perfect representative of the valerian of the English Pharmacopœia.—*O'Shaughnessy, pages* 403-404. *N. Jatamansi* is a dwarf herbaceous plant with a long hairy taproot. The stems are perennial, very short, and simply divided into a number of shaggy scaly crowns, from which the leaves are produced; the branches erect, downy, and a few inches high; leaves obovate, lanceolate, 5-ribbed downy, those at the base acute, the upper ones obtuse; the flowers are of a pale pink colour, clustered in the axils of the upper leaves, which form a kind of involucre for them. It is a native of Nepaul, on the Himalaya Mountains, and in Delhi, Bengal, and the Dekan. This species is the true Spikenard of the ancients, and is esteemed not only as a perfume but as a stimulant medicine. Oriental writers give it as a remedy for a multitude of diseases, and it seems to be really valuable in cases of epilepsy and hysteria.—*Eng. Cyc.*

(5585) NARDUS, a genus of Grasses belonging to the tribe *Rotbelliæ*. It has the spikelets in two rows on one side of the rachis of one flower; glumes absent; outer pale keeled, tapering into a subulate point; stigmas elongate, filiform, protruded at the apex of the flower.—*Eng. Cyc.*

(5586) NAR-PUTTE, the Tamil name of a Ceylon tree which is used for canoes, planks of vessels, &c. It grows to about thirty feet in height, and twenty inches in diameter. It is not durable, and is of little use.—*Edye Ceylon.*

(5587) NARWALI OR NARVALI FIBRE, CORDIA ANGUSTIFOLIA, is found common near Severndroog where ropes are made of the fibres.—*M. E.*

(5588) NARUVEALY, the Tamil name of a Ceylon tree which grows to about twenty inches in diameter, and fifteen feet in height, not of much use. It produces a small red fruit which is of a very glutinous nature, and much esteemed by the natives of Malabar. From the bark of this tree a kind of cordage is made, which is used for the purposes required in the hills, and in the conveyance of timber, &c.—*Edye Ceylon.*

(5589) NARVELL, a Ceylon wood, sometimes called Jambu, in Tamil and Portuguese. It grows to about eighteen inches in diameter, and from ten to fourteen feet in height. It is used for the frames of native vessels and boats, and is not considered as a very durable wood. After it has attained its full growth it produces a berry which the natives use as food.—*Edye, Ceylon.*

(5590) NASTOE EDULIS, used as food in China, is a cryptogamic plant.

(5591) NASTURTIUM, an old word applied to some kind of pungent herb, such as Cress. By the English of the present day it is given to the *Tropæolum majus* [TROPÆOLUM], an American annual with pungent fruit; by botanists, to the Water-Cress and plants allied to it; by the Romans it was applied to a plant resembling Mustard in its qualities. The species now referred to the genus *Nasturtium* were formerly included under *Sisymbrium*. *Nasturtium* was separated by Brown, and is principally distinguished by the position of the cotyledons, a point of primary importance in the whole order of *Brassicaceæ*. In *Sisymbrium* the cotyledons are folded with their back upon the radicle, whilst in *Nasturtium* their edges are presented to it; in the former the cotyledons are said to be incumbent; in the latter accumbent. This is either grown from cuttings or seeds, and merely requires to be protected from the hot winds to be in flower all the year round; it grows much better in beds than pots. The flower and leaf are eaten mixed with other salads, and the seeds when green are pickled.—*Jaffrey.*

(5592) NASTURTIUM, INDIAN CRESS, *Tropæolum majus* and *minus*, raised from seeds sown at the commencement of the rains, succeeds well if not too much exposed to the sun, of easy cultivation, seldom produces seed on the plains, the introduction of the other species and varieties cannot be recommended. Natives of Peru.—*Jaffrey.*

(5593) NASTURTIUM. WATER CRESS. Griffith says he found an indigenous species of nasturtium in the Provinces, but he does not appear to have described it.—*Mason.*

(5594) NASTURTIUM OFFICINALE: SISYMBRIUM NASTURTIUM, the Common Water-Cress. In addition to the characters of the genus, this plant is known principally by the form of its leaves. The upper leaves do not separate into distinct leaflets, being pinnatifid with narrow segments. The petiole of the leaf does not in any manner embrace the stem. The flowers are white, and the pods when ripe, are about an inch long. It is a native of rivulets throughout the world, and is very plentiful in Great Britain. It has a warm agreeable flavour, and has long been one of the most popular plants as a salad. It was formerly much used in medicine as a diuretic and anti-scorbutic, but its great consumption now is as an article of diet. As it frequently grows amongst plants that are not wholesome, and that bear to it a general resemblance, it would be well for every one to be acquainted with its characters. The plant most frequently mistaken for it, especially when out of flowers, is the fool's water-cress. [SIUM.] From this it may be always distinguished, and in fact from all other *Umbelliferæ*, by the petioles of the leaves not forming a sheath round the stem. The water-Cress is cultivated to a very great extent in the neighbourhood of London. The plants are placed out in rows in the bed of a clear stream in the direction of the current, and all that is required for their successful growth is replanting occasionally and keeping the plants clear of mud and weeds;

sandy and gravelly bottoms are best. "Some market-gardeners who can command only a small stream of water, grow the water-cress in beds sunk about two feet in a retentive soil, with a very gentle slope from one end to the other. Then, according to the slope and length of the bed, dams are made six inches high across it, at intervals, so that when these dams are full, the water may rise not less than three inches on all the plants included in each. The water, being turned on, will circulate from dam to dam, and the plants, if not allowed to run to flower, will afford abundance of young tops in all but the winter months." (G. Don.) Water-Cresses grown in this way have not so fine a flavour as those from natural streams.—*Eng. Cyc.*

(5595) NASTURTIUM. PALUSTRE is also a native of wet places. It has a fibrous root and small flowers, with the petals only as long as the calyx. The two last are also natives of Great Britain. Other European species are *N. lippizense N. pyrenaicum, N. anceps, N. amphibium, N. fluviatile, N. armoracioides, N. terrestre,* and *N. austriacum.*—*Eng. Cyc*

(5596) NASTURTIUM SYLVESTRE, is a less common species. It is found on river banks and in wet places. It is distinguished from the last by having yellow flowers, and by its petals being twice as long as the calyx.—*Eng. Cyc.*

(5597) NATCHENNY.

Mooroon, BENG.
Ragie, DUK.
Natchenny, Ragie, GUZ, HIND.
Mootamy, MALEAL.
Rajika, Tsjettipullu, SANS.
Kalwaragoo, TAM.
Ponassa, Tamidaloo, TEL.

The name of a useful and most valuable grain, which is eaten and prized by all classes of the natives of India. It is about the size of mustard seed, and darkish coloured. It is made chiefly into cakes, and is also prepared in several other ways; it has a sweetish taste. It is grown on the Coromandel Coast, and in many parts of the Western presidency.—*Faulkner.* It is the Elewsine corocana of botanists.

(5598) NATRON CARBONATE OF SODA Natron is abundant in the vicinity of Ava, where it is used by the Burmese instead of soap, and they call it "earth soap."—*Mason.*

(5599) NAUCLEA, a genus of Plants belonging to the natural order *Rubiaceæ.* It has a calyx with an oblong tube and a short truncate or 5-toothed limb; the corolla is funnel-shaped, with a slender tube, a naked throat, and 5 spreading oval oblong lobes; the anthers are inclosed, and always shorter than the lobes of the corolla; the capsules are 2-celled, sessile upon the receptacle, but gradually attenuated to the base. The seeds numerous, imbricate, winged, fixed to oblong placentæ, which are adnate to the dissepiment; the embryo is invested in a fleshy albumen. The leaves are opposite, or 3-4 in a whorl. petiolate, or sessile. The bracts wanting at the base of the head of flowers, but with linear paleæ among the flowers, which are crowded and sessile. The species are unarmed trees, rarely shrubs, are natives of India and Africa. There are 37 species of this genus enumerated, all of which are natives of the East, but do not possess any peculiar qualities which entitle them to particular notice.—*Eng. Cyc.*

(5600) NAUCLEA CADAMBA.

Cuddum. HIND.
Vella Cadamba, TAM.
Rudrakshakamba, TEL.

A noble tree, wood yellow, used for furniture. Travancore 292, Bengal 16. *N. Cadamba* has brachiate branches; petiolate coriaceous ovate leaves; triangular stipules; terminal solitary peduncles, usually shorter than the heads, which are globose. The flowers are orange-coloured, collected into heads about the size of a small apple; the style is white and exserted. The seeds not winged; the leaves from 6 to 10 inches long. Kadumba is the native name of this tree; it flourishes about Calcutta and Malabar, where it grows to be a very large tree, and is ornamental and very useful from the extensive shade it affords.—*Eng. Cyc.* It is plentiful in Kotah Boondee and Mewar, rare in Ajmeer. The wood is soft and fine grained like satin-wood. The flowers are fragrant and are called Kurun-phool "This tree would be highly ornamental in compounds," along with the bukain and neem.—*Genl. Med. Top. p.* 182. This tree grows to a very large size, in the Dekhan where it is common about villages; the fruit is eaten by the natives, who esteem the tree as "holy."—*Riddell.* In Tenasserim this fragrant orange-flowered species of nauclea is sometimes cultivated by the natives. Its large glossy leaves afford a thick and beautiful shade; and, in Indian Mythology, it is one of the four shadow giving trees that grow on mount Meru—viz. the eugenia, the nauclea cadamba, the banyan, and the peepul.—*Mason.*

(5601) NAUCLEA CORDIFOLIA.

Daduga, TEL.
Keli kadam, BENG.
Munja cadamba, TEL.

A large tree growing abundantly in the mountainous districts of the Peninsula of India, wood yellow, rather close grained. It is used for common purposes, and easily worked, but is best suited for work which is sheltered, bedsteads, &c. being much affected by alternation of dry and wet weather. *N. parviflora,* (near cadamba) is also frequent in the Western Coast, and is valued for yielding flooring planks, packing boxes, &c. Wight No. 49, Travancore 66-223-288, Palamcottah 242, Bangalore 304.—*M. E. J. R.* This like the foregoing species, grows to be a large tree, it is a native of the mountains of Coromandel the wood is exceedingly beautiful, its colour is like that of the box tree but much lighter, and at the same time very close grained, it is to be had of a very large size from one to two feet or more in diameter and is used for almost every purpose where it can be dry; for furniture it answers exceedingly well being light and durable. In timber yards the camboo which if not the same as the above described, is confounded with this and with Bundaroo at Rajahmundry I found Patseroo, Bundaroo and Camboo indiscriminately applied. The Bundaroo I suppose is the Boti kadami.—*Rhode. M.S.S.*

(5602) NAUCLEA GAMBIER, of Hunter ('Linnæan Transactions,' vol. ix.) is now *Uncaria Gambier* [UNCARIA]

(5603) NAUCLEA PARVIFOLIA, has petiolate obovate obtuse leaves, oval stipules, and erminal solitary peduncles; sometimes the peluncles are in triplets, when the middle one is he shortest. It is a native of the East Indies nd all the coast of Coromandel, but chiefly in he mountains of the Philippines. The flowers re light yellow and globular, about the size of a lum. The wood is of a pale chestnut-colour, irm, and close-grained: it is useful for purposes vhere it can be kept dry, but when exposed to vet it soon decays.—*Eng. Cyc.*

(5604) NAUCLEA PARVIFLORA. *Rubiaceæ* ll. 123.

Veer codumbay, ENG. | Bota Kadami, TEL.
eer codumbai, TAM.

Grows to be a large tree: is a native of almost very part of the coast of Coromandel but chiefly p amongst the mountains. The wood is of a light hesnut color firm and close-grained, is applied o various purposes where it can be kept dry, but xposed to wet it soon rots.—*Rokde M.S.S.* This is a strong fine grained timber, sustaining a eight of 400 lbs. Beams of considerable size re procurable. The wood is dark colored and lose-grained, but according to Roxburgh, soon ots if exposed to wet. From the fineness of its rain it seems well fitted for cabinet purposes, nd has the advantage of being easily worked. -*Wight.*

(5605) NAUTILIDÆ, OR NAUTILACEA, family of Cephalopodous *Mollusca*. According o Lamarck, they constitute the sixth family of is Polythalamous *Cephalopoda*, consisting of the enera *Discorbites*, *Siderolites*, *Polystomella*, *orticialis*, *Nummulites*, and *Nautilus*. To these r. G. B. Sowerby, Jun., adds *Simplegas* and *ndosiphonites*. In the system of M. De Blainlle it is the fifth family of his *Polythalamacea*, d comprises the genera *Orbulites*, *Nautilus*, *olystomella*, and *Lenticulina*. The genus *Nau-us* is the type of this family. The species habit the seas of warm climates, especially ose of Asia and Africa, and their islands, mboyna, Zanzibar, and New Guinea; and the cific and Australian Oceans.—*Eng. Cyc.*

(5606) NAVANE (Can.) is grown in very few places in Mysore, and serves as food for poor people.—*M. E. Cat.*

(5607) NAVILE. Oil seeds of Bassia latifolia.

(5608) NEATS FOOT OIL. At the Madras Exhibition of 1855, this was exhibited by the Madras Tariff—Tanjore Local Committee and Lieut. Hawkes. Its uses as a softener of leather, &c. &c. are well known.

(5609) NEEDLES.

Sooee, GUZ. HIND.

Are well-known useful articles, made from the best steel, and reduced by a wire-drawing machine to a suitable diameter. Dr. Ure states that, "the construction of a needle requires "about 120 operations; but they are rapidly, "and uninterruptedly successive."

(5610) NEEL. INDIGOFERA TINCTORIA.

Neelum, TAM.

(5611) NEEMOOKA. Root of several species of Cissampelos.—*Ben. Phar.*

(5612) NEERADI MOOTOO. Species of JATROPHA.

(5613) NEERADI MOOTOO OIL.

Neerada Mootoo Yennai, TAM. | Junglie Badam ka Tel, HIND.

This valuable oil was sent to the Madras Exhibition under the various names of Neeradeemootoo, jungle Almond, Maroty, Tamana, Muravettie, Neervettie and Soorty. It is said to be in great repute, as a medicine amongst native practitioners and the kernel enters largely into their prescriptions. It might probably be found of use in the arts, it much resembles almond oil but is rather thicker. The seeds cost in Madras As. 2-6 per seer—excellent specimens were contributed by the Madras Tariff, Travancore and Cochin Local Committees and Lieutenant Hawkes.

(5614) NEERIJA BARK. Bark of Elæodendron Roxburghii.—*Ben. Ph.*

(5615) NEEROODEE.

Chinna neeroodee, TEL. | Neeroodee, HIND.

(5616) NEILGHERRY GRASS. This is a species of lobelia, which is unknown on the Neilgherries, its name notwithstanding, and probably came from Java. Wight, writing on the lobelias says: "There is a small cespitose species much cultivated in pots, by amateurs, under the strange name of Neilgherry grass. I suspect the *Lobelia succulenta* of Blume, a Java plant."—*Mason.*

(5617) NEILGHERRY NETTLE, HOROO SURAT OF ASSAM. Urtica heterophylla.

Herpah or Serpah, BHAOTEA. | Theng Mah, CHINESE.

Is the most widely diffused of the large Indian Nettles, being found in South Concan, along the Malabar coast; the Mysore, the Neilgherries, the valleys of the Himalayas in Assam & Burmah. It is an annual plant, the sting of which produces intense pain, the bark abounds in fine, white, glossy silk like fibres, but these probably differ with the locality in which the plant is grown. Dr. Wight describes those of the Neilgherries, as a fine soft flax like fibre, and fitted to compete with flax in the manufacture of even very fine textile fabrics. The Todawars extract it by boiling the plant, and use it as a material for making thread. Mr. Dickson passed it through his machine and liquid, which rendered it like a beautiful, soft, silky kind of flax. He calls it a wonderful fibre, of which the tow would be useful for mixing with wool, as has been done with the China grass.—*Royle.*

(5618) NELUMBIACEÆ, a natural order of Exogenous Plants, by some writers associated with *Nymphæaceæ*, or Water-Lilies, which they resemble in appearance and manner of life, inhabiting the fresh waters of the temperate parts of the world, and producing large polypetalous flowers with numerous stamens. But these orders differ in such important circumstances that they can hardly be regarded as plants of very close alliance, much less as members of the same order for *Nelumbiaceæ* have no albumen, and their system of female organs is broken up into its original elements, while in *Nymphæaceæ* there is an abundance of albumen, and the female system is completely consolidated. *Nelumbiaceæ* are readily known by their carpels being distinct, 1-seeded, and buried in the cavities of a large truncated fleshy receptacle, which eventually forms a broad hard bed, filled with holes, in each of which there is a single ripe nut. Notwithstanding their large flowers, these plants must be regarded as among the lowest forms of the exogenous type. The best known species is *Nelumbium speciosum*, a magnificent water-plant floating in the rivers and ditches of all the warmer parts of Asia, and also found in the Nile: its nuts are supposed to have been the sacred bean of Pythagoras; its fleshy stems are used as food by the poorer inhabitants of China. The nuts of all the species are eatable and wholesome. *Nelumbium* is the only genus. —*Eng. Cyc.*

(5619) NELUMBIUM, a genus of Plants belonging to the natural order *Nymphæaceæ*, but sometimes regarded as the type of an order called *Nelumbiaceæ*. It has many distinct carpels, half-immersed in the profoundly honey-combed obconical elevated torus, each bearing a style with a solitary seed in each carpel, which is exarillate, and destitute of albumen. The flowers are large and showy, white, red, or yellow. Both leaves and flowers rise from the surface of the water.—*Eng. Cyc.* Writing regarding the Nelumbium, Mr. Fortune says I now walked down to the lake accompanied by the priests. No flower could be more beautiful or more majestic than the Nelumbium was at this season. As I stood on the little romantic bridge I looked to the right and left; my eye rested on thousands of these flowers, some of which were white, others red, and all were rising out of the water and standing above the beautiful clear green foliage. The leaves themselves, as they lay upon the smooth surface of the lake, or stood erect upon long footstalks, were scarcely less beautiful than the flowers, and both harmonized well together. Gold. silver, and others kinds of fishes were seen swimming swiftly to and fro, and apparently enjoying themselves under the shade of the broad leaves, in happy ignorance of the encounter between their protectors and their piratical enemy.—page 350. At another place he says, in the garden of a mandarin at Ning-po. I once observed a very beautiful variety of the Nelumbium, different from the red and white kinds already noticed, and which I may distinguish by the name of *N. vittatum*, its flowers being finely striped. It was evidently extremely rare in that part of China, so rare indeed that I could not succeed in procuring a plant to send to England.—page 351. Although these plants are generally grown in the stove when their cultivation is attempted in England, they are fitted by nature to endure a very low degree of temperature in winter. They are abundant in all parts of the province of Kiang-nan, at Shanghae, Soo chow, and Nanking, where the winters are very severe. The ponds and lakes are often frozen up, and the thermometer frequently sinks to within a few degrees of zero. During the spring and summer months the plants form and perfect their leaves, flowers, and fruit; in autumn, all the parts which are visible above water gradually decay, and nothing is left in a living state except the large roots, which remain buried deep in the mud, and they continue in a dormant state until the warmth of spring again calls vegetable lit into action. p. 351. The Nelumbium, c *Lien-wha*, is cultivated very extensively i China for the sake of its roots, which ar esteemed an excellent vegetable, and are muc used by all classes of the community. Th roots attain their largest size at the perio when the leaves die off; and are dug up an brought to market during the winter months i the north of China. The stalls of the green gr cers are always loaded with them at that seaso of the year. Although in high repute among the natives, being served up with many of the dishes and forming part of others, I must sa that I never liked them, nor are they general liked by foreigners. An excellent description arrowroot is made from them, which is conside ed equal in quality to that which England impor from the West Indies. The seeds are also held high estimation; they are commonly roasted b fore being served up to table.—*Fortune, pa* 352.

(5620) NELUMBIUM SPECIOSUM. Juss. Egyptian lotus. The Plant.

Tawmaray, Tam.
Kangwel, Dut.
Kamala also Padma, Sans.

(5621) NELUMBIUM SPECIOSUM, Py-
rhagorean Bean, has a polypetalous corolla, and
inthers drawn out beyond the cells into a club-
shaped appendage. It is a native in slow running
streams and tranquil waters, in the warmer parts
of Asia. The flowers are very beautiful, smell-
ng of anise, and generally of a rose colour, sel-
lom white. A variety of this species, Tamara,
as its outer stamens sterile, dilated at the top,
vinged, obcordate, the appendage rising from a
otch at the apex. It is a native of Malabar.
'he fruit resembles an instrument once used in
lay by the French, called Lotos, and is one of
f the plants supposed to be the celebrated
otos of antiquity, formerly found in Egypt.
t was known to the Greeks, and is mentioned
s growing in Egypt by Herodotus (ii. 92),
'heophrastus, and others. Although not now
be met with in that country, there can
e no doubt as to its having actually existed
ere, either naturally or in a cultivated
ate, for these authors speak of it in clear
d decisive terms, and their accounts are
nfirmed by the sculptures still preserved,
hich testify that this species, as the proper
otos, has obtained religious reverence. It
spoken of as having been used as food
the Egyptians. Both roots and seeds
e esculent, and are accounted cooling and
rengthening, and to be of service in ex-
eme thirst, diarrhœa, vomiting, &c. In China
is called Lien-wha, and the seeds and slices of
e hairy root, with the kernels of apricots and
alnuts, and alternate layers of ice, were fre-
ently presented to the British ambassador and
s suite, at breakfasts given by the principal
andarins. The roots are laid up by the Chi-
se in salt and vinegar for winter use. Thun-
rg says this plant is held sacred in Japan, and
considered pleasing to the deities, the images
which are frequently made sitting on its large
ves. The seeds are somewhat of the size and
rm of an acorn, and of a state more delicate
an that of almonds.—*Eng. Cyc.* This beauti-
plant, which floats on the surface of the
ter, is well known to be highly venerated
the Hindoos "but it is the more immediate
ribute of vishnoo, "from being the prime
aquatic vegetables, and he a personification
water." It is also peculiarly sacred to
kshmi, the wife of Vishnoo who is some-
es called Kamala, or Lotus-like: it is moreover,
emblem of female beauty. This plant is the
e Lotus of the Egyptians, and the Nymphœa
lufer of Sir William Jones, Nilufer being its
abic name. The new blown flowers of the rose
oured Tamaray have an agreeable fragrance;
se of the white and yellow have less odour. There is a variety which is blue, a native of Cashmere and Persia.—*Ains. Mat. Med. p.* 162. This grows at Lahore and in Cashmere. Its flowers, which are abundant on the lakes, are used by the Hindoos in their religious ceremonies called Pooja. Every morning I saw, at Cashmere, vast numbers of these flowers, which had served in the rites of the Pooja, flowing down the river. Its boiled roots are eaten as a pot-herb by the natives; in Lahore they are called Pe, in Cashmere Nadroo. Nelumbium seeds are also employed as articles of diet amongst the natives of India; I believe they are the same kind of seeds as those from which the ancient Egyptians made a sort of bread.—*Honigberger, p.* 315. Several aquatic plants increase the list of Chinese plants among which the nelumbium covers extensive marshes in the eastern and northern provinces, otherwise unsightly and barren. The root is two or three feet long, and pierced longitudinally with several holes; when boiled it is of a yellowish color and sweetish taste not unlike a turnip. Taro is used less than the Nelumbium, and so are the watercaltrops and water-chestnuts. The taste of watercaltrops when boiled resembles that of new cheese, water-chesnuts are the round roots of a kind of sedge and resemble that fruit in color more than in taste, which is mealy and crisp. The sweet potatoe is the most common tuber for although the Irish potatoe has been cultivated about Canton and Whampoa for scores of years, it has not become a common vegetable among the people.—*Williams' Middle Kingdom, Vol.* II. *page* 44.

(5622) NELUMBIUM SPECIOSUM: Juss. Root of the Peltated water lily. Willd.

The Root.

Tawmaray Kalung, Tam.
Kungwelka gudda, Hind and Duk.
Bekhiniioofur, Pers.
Sahastraputra, Sans.

This is an esculent root and is also prescribed medicinally as cooling and demulcent. See Hort. Mal. Part xi. page 60.—*Ains. Mat. Med. p.* 117. The roots of the sacred bean of India after being cut into slices, dried and fried in oil, are eaten by the natives and considered a delicacy.—*Jaffrey.*—This is the root of a plant highly venerated amongst the Hindoos. It is dressed in different ways by the natives but like the Allie Kalung, it is only to be obtained during very dry weather as it grows in the beds of tanks. 1st Section 4th.—*Ainslie, p.* 251. Nelumbium Speciosum, the Large water lily, grows wild in tanks, in all parts of India.

(5623) NELUMBIUM SPECIOSUM. Sacred bean plant. The Flower. The flower of this plant being much like a water lily, it is usually regarded as one, but the fruits are so different that botanists have placed them in different natural families.—*Mason.*

(5624) NELUMBIUM SPECIOSUM. THREAD of the EGYPTIAN LOTUS.

Tawmaray noole, TAM.
Tawmaray darum, TEL.
Padma, SANS.

Tawmary noole is the name given by the Tamools to the long, fine filaments which are found within the cells of the stalks of the sacred Tamaray plant. With them are prepared those wicks which on great and solemn religious occasions are burnt in the lamps of the Hindoos placed before the shrines of their deities. Other wicks of a similar nature but less venerated are made with the filaments of the Allie (Nymphæa Lotus) and also from those of the Shengalaneer, (Nymphæa odorata); the delightfully smelling flowers of which are held in high estimation by the Indians.—*Ains. Mat. Med. p.* 202.

(5625) NEMESIA FLORIBUNDA, SCROPHULARIACEÆ. These plants may be cultivated from seed in any rich light soil, the colour of the flowers is purple.—*Riddell.*

(5626) NEMOOKA ROOT, the root of several species of Cissampelos, and is an efficient substitute for Pareira.—*O'Shaughnessy.*

(5627) NEMOPHILA AURITA, HYDROPHYLLACEÆ. These plants are all annuals, and require a great deal of moisture, growing and flowering in shady situations, the colors are white and purple, blue and dark purple, they are natives of California, and North America.—*Riddell.* *Nemophila Insignis*, and *maculata* are too tender to succeed well on the plains. N. maculata the spotted variety succeeds to a certain extent if sown after the heavy rains are past.—*Jaffrey.*

(5628) NENDOON. Hard, though coarse, open-grained, heavy Ceylon wood.

(5629) NEOPHRON PERCNOPTERUS. Mr. C. J. Anderson, in his interesting work entitled 'Lake Ngami,' notices the curious fact of this Vulturine bird resorting to vegetable food. In the desert sandy region extending southward from Walfisch (*i. e.* 'Whale-fish') Bay, along the eastern coast of South Africa, "a kind of prickly gourd (called, by the natives, *naras.*) of the most delicious flavour" occurs in great abundance; the creeping plant that bears it covering almost every little sand-hillock; and moreover fixing, "with wonderful tenacity, by means of its extensive ramifications, the constantly shifting sands: it is, indeed," remarks Mr. Anderson, "to those parts what the sand-reed (*Ammophila arundinacea*) is to the sandy shores and downs of England. In this barren and poverty-stricken country, food is so scarce, that without the 'naras' the land would be all but uninhabitable. It is not man alone, that derives benefit from this remarkable plant; for every quadruped from the Field Mouse to the Ox, and even the feline and canine races, devour it with great avidity. Birds are, also, very partial to it, more especially Ostriches, who during the 'naras' season are found in great abundance in these parts. *I have seen the White Egyptian Vulture feed upon it.*" Captain Watkins, in a paper on the Ornithology of Andalusia ('Zoologist.' November, 1856), states that he possesses, alive, a common Kite (*Milvus regalis*) and also a Black Kite (*M. ater*). "These birds, in their present domestic state, have a great *penchant* for vegetables and fruits. I have watched them often in my kitchen-garden plucking the pods of peas, and eating the contents; a bed of radishes, also, (which I was at a loss to conceive what had demolished,) I one morning found occupied by my two pets, eagerly devouring them: they could not have been driven to it by hunger, as they were well supplied with birds and young Rabbits. Since the figs and peaches have been ripe, they have indulged most freely in their taste for fruit, nothing pleasing them better than a fig." In the *Annals and Magazine of Natural History*, xii (1843), p. 269, the curious fact is recorded of the Jaguar (FELIS ONCA) striking down and devouring the nests of a honey-producing Wasp of S. America! In a recent notice of the devastations of Locusts in South Africa, we observed the NEOPHRON PERCNOPTERUS designated as the 'Locust-bird'; making its appearance in vast numbers to prey on the destructive insects: but it is not what is ordinarily known as the 'Locust-bird' in that part of the world, which is a much smaller bird, appertaining to the Starling or Maina group. According to Sir James Alexander, as quoted by Mr. Anderson, (and given on the authority of the natives about the Orange river,) when the Ostriches have left their nest in the middle of the day in search of food," "a white Egyptian Vulture may be seen soaring in mid-air, with a stone between his talons. Having carefully surveyed the ground below him, he suddenly lets fall the stone and then follows it in rapid descent. Let the hunter run to the spot, and he will find a nest of probably a score of eggs, some of them broken by the Vulture." We have all heard o the story of an Eagle, or a Gull, or a Crow, (fo the anecdote is current of all of them,) droppin the 'shell-fish' upon a stone; and of the bird' mistaking the philosopher's bald pate for one but here the case is reversed; for the stone i taken up and dropped on the eggs of the Ostrich In his account of the British Carrion Crow Mr. Mudie remarks—"There are modern in stances of the story of the ancient philosophe who was killed by a Crow mistaking his head fo a stone, and dropping an Oyster on it in order t break the shell. One of these was seen by th celebrated Watt. A Crow caught up a crab rose with it to a considerable height, and droppe it—not on the head of a modern philosopher, o he might have come off more safely than th ancient one,—but on a stone, and descended t her feast." Again, Mr. Selby remarks, of th Hooded Crow, "I have repeatedly observed o of these birds to soar up to a considerable height in the air, with a cockle or mussel in its bill, and then drop it upon the rock, in order to obtain the contents." Anecdotes of Gulls performing the same feat are recorded in Cabanis' 'Journal fuer Ornitholigie,' Vol. III (1844-5) : so that there is no particular reason to disbelieve the assertion of the NEOPHRON dropping a stone on the eggs of the Ostrich.—*Mr. Bligh in Calcutta Review.*

(5630) NEPAL PAPER PLANT. DAPHNE CANNABINA (THYMELÆÆ). At the Great Exhibition of 1851, many were much interested about a huge sheet of Nepal paper exhibited by Colonel Sykes. This was curious, not only on account of its size, but also on account of the plant from which it was made. This belongs to a genus and family containing plants remarkable for their fibrous bark. Thus the Lace-bark tree (*Daphne Lagetta*, now *Lagetta lintearia*) of the West Indies is "remarkable for the beautiful net-like appearance of its several easily separable layers of bark, whence it has received its English name. As the fibres of other species possess considerable tenacity, they have been employed in making cordage ; and the toughness, as well as fineness of the inner bark of these plants, may be seen in a plant common in English gardens, and used in medicine on account of its acridity, that is, the Mezereon, *Daphne Mezereum* of botanists. It is from the inner bark of one of these plants, the *D. Bholua* (*D. cannabina* of Loureiro, and which is supposed to be identical with the *D. odora* of Thunburg), which is extremely abundant in the Himalayas, that this Nepal paper is made, as from other species in other countries. Another plant of the same, or of an allied genus, as it is called both *Daphne* and *Gnidia eriocephala*, is very common on the ghauts of the West of India, and in the hilly parts of the Sothern Mahratta country and of the Dukhun. Several specimens, from various localities, are in Col. Sykes's collection. It is probable that it might be turned to the same use as the Nepal plant. Of the uses of this plant good accounts have been given by Mr. Hodgson ('Journ. As. Soc.,' i, p. 8, 1832) and Dr. Campbell. The former describes the process as consisting, first, in boiling slips of the inner bark of the paper plant in a ley of wood-ashes for about half an hour, by which time the slips will be quite soft. These are then beaten in a stone mortar with a wooden mallet till they are reduced to a homogeneous pulp. This is then diffused through water, and taken up in sieves and paper frames, as in the ordinary process for making paper by hand. When dry, the sheet of paper is folded up ; sometimes it is smoothed and polished by being rubbed on wood with the convex side of a conch shell : but Mr. Hodgson does not explain how the very large sheets of several yards square are made. Though called Nepalese, the paper is not manufactured in Nepal, but in Cis-Himalayan Bhote, in the midst of its immense forests, where there is an abundant supply of the plant, of wood for ashes and for firewood, as well as a constant supply of clean water. This paper is remarkable for its toughness, as well as its smoothness. Some of it, in the form of bricks of half-stuff, was sent to England previous to the year 1829. As the quantity sent was not sufficient for a complete experiment, a small portion of it was made into paper by hand. An engraver, to whom it was given for trial, stated that "it affords finer impressions than any English-made paper, and nearly as good as the fine Chinese paper which is employed for what are called India paper proofs." ('Gleanings in Science,' i, p. 210.) Dr. Campbell decribes the paper, as made by the Bhoteahs, "as strong, and durable as leather almost, and quite smooth enough to write on ; and for office records, incomparably better than any India paper. It is occasionally poisoned by being washed with preparations of arsenic, in order to prevent the destruction caused by insects. Many of the books in Nepal, written on this paper, are said to be of considerable age, and that the art of making paper seems to have been introduced about 500 years ago from China, and not from India." He states that this paper may easily be procured at Patna, Purneah and other places in the plains of both Southern and North-Western India.—*Royle fibr. pl. page* 311. The dried bark, of the Nepaul paper plant, may be substituted for the Mezereon (D. Mezereum) of the London Pharmacopœia, the Bazar Mezereon, is almost always inert from age.—*Beng. Phar. page* 279.

(5631) NEPENTHACEÆ, *Nepenths* a natural order of Exogenous Plants inhabiting the damper and warmer parts of Asia, and having in the place of leaves, large hollow bodies furnished with a lid, and containing water secreted from a peculiar glandular apparatus with which they are lined. These bodies, or pitchers, as they are called, appear at the end of a leafy tendril-like expansion of the bark, and are considered to be a hollow state of the apex of the petiole of a leaf, while the lid that closes them is regarded as the blade. Their flowers are diœcious, green or brown, apetalous, arranged in cylindrical racemes, and are succeeded by a capsular fruit filled with fine fusiform seeds, which look liked very small sawdust. They are considered to be closely akin to *Aristolochiaceæ*, and also related to *Sarraceniaceæ* and *Euphorbiaceæ*. Adolph Brongniart has pointed out a resemblance between *Nepenthaceæ* and *Cytinaceæ* ; but Lindley remarks that it is impossible to agree in this conclusion :—"To say nothing of the extreme dissimilarity in habit between these plants, the structure of their fruits appears to be essentially different ; and the seeds of *Cytinus* being unknown, the resemblance between it and *Nepenthes* is reduced to a similarity in the arrangement of the anther swhich cannot in the present case be considered of much importance, as it in some degree depends upon the unisexuality of the flowers of both genera. A better approximation of the order has been made by Brown, who points out a relation to Birthworts (*Aristolochiaceæ*); as to which, the structure of the wood in some respects confirms his views. Like many in that order it is zoneless, although plainly exogenous; but it has this in particular to characterise it, that the system of spiral vessels is developed in a degree unknown in any other plants. Endlicher adopts the same view as does A. Bronginart, and I have formerly coincided with these botanists; but the adherent ovary of Birthworts, their highly-developed calyx, axile placentation, and hermaphrodite flowers, are serious difficulties in the way of a close contact between them and Nepenths, unless the peculiar structure of the wood, the consideration of which I for the present abandon should lead to the final establishment of the class of Homogens, in which case Nepenths and Birthworts will be brought into contact or at least, near neighbourhood. For the present the true position of this order must be regarded as an undetermined point." Lindley places them in the Euphorbial alliance, observing that " its points of agreements are its unisexual flowers, albuminous seeds, incomplete floral envelope, and climbing habit. Its great disagreement consists in its indefinite seeds and peculiar woody structure, which is however in some respects without example." ('Vegetable Kingdom.') The water found in an unopened pitcher was found to emit while boiling an odour like baked apples, and to yield minute crystals of superoxalate of potash. There are about six species of *Nepenthes*.

(5632) NEPENTHES. The pitcher-plant grows on strong and grassy hills about Amwee, near the Jyntea Hills and crawls along the ground; its pitchers seldom contain insects in the wild state, nor can we suggest any special function for the wonderful organ it possesses.—*Hooker, Him. Jour. Vol.* 11. *page* 315. There are about six species of Nepenthes, the best known of which, the Pitcher plant, is the N. Distillatoria. The Nepenths, *Nepenthaceæ*, is a natural order of exogenous plants, inhabiting the damper and warmer parts of Asia, and have in the place of leaves, large hollow bodies furnished with a lid and containing water secreted from a peculiar glandular apparatus with which they are lined. These bodies, or pitchers as they are called appear at the end of a leafy tendril-like expansion of the bark and are considered to be a hollow state of the apex of the petiole of a leaf, while the lid that closes them is regarded as the blade.—*Eng. Cyc.*

(5633) NEPHELIUM LITCHI, SAPINDACEÆ. This tree, orginally from China, is an ever-green, and grows to a large size. The fruit is of a dark brown color, and contains a glutinous yellow sweet sort of pulp; it is not much prized—perhaps from its inferior quality to the Chinese fruit, which is much esteemed. The fruit ripens in March and April.—*Riddell.*

(5634) NEPHELIUM. RED NEPHELIUM. This is a small inferior Tenasserim fruit, eaten by the natives only, though belonging the same genus which produces the famous lichi, and bearing its fruit in bunches like that.—*Mason.*

(5635) NEPHELIUM. WILD RAMBOUTAN. One of the indigenous trees of Tenasserim bears a fruit whose subacid is very agreeable to the palate, and much resembles that of the ramboutan so famous at Malacca. Malays, to whom I have shown the fruit, say it is the wild ramboutan, and the tree certainly belongs to the same genus; but never having met with it in flower, I cannot determine the species.—*Mason.*

(5636) NEPHRITE.—*Jade* or *Axe-Stone* — a mineral which occurs in masses. The structure is compact. Its fracture is coarse, splintery. Hardness 7·0. It is very tough. Colour dark-green and green of other shades. Translucent on the edges. Specific gravity 2·9 to 3. Before the blow-pipe it whitens, but does not fuse, but with borax it forms a transparent glass. The following is an analysis by Kastner:—

Silica	50·50
Alumina	10·00
Magnesia	31·00
Oxide of Iron	5·50
Oxide of Chromium	0·05
Water	2·75
	——99·80

It is carved into images and worn as a charm. It was supposed to be good in diseases of the kidney—hence its name. It is found in New Zealand, China, and Western America.—*Eng. Cyc.*

(5637) NEPHRODIUM FILIX, MAS. A FILIX MAS.—*Honigberger.*

(5638) NERITA, a genus of Gasteropodous *Mollusca*, the type of the family *Neritidæ*. The genus *Nerita* has the following characters:—Shell thick, smooth, or spirally grooved; epidermis horney; outer lip thickened, and sometimes denticulated within; columella broad and flat, with its inner edge straight and toothed; operculum shelly. Dr. J. E. Gray makes the *Naticidæ* the first family of his second section, *Eriophthalma* (*Edriopthalma ?*), of his second order *Phytophaga*. Under the *Naticidæ* he comprises the following genera:—*Natica*, *Neverita*, *Nacca*, *Cepatia*, *Polinices*, *Mammilla*, *Cernina*, *Globulus*, *Naticina*, *Crpytostoma*, *Stylina*, (?), *Radula* (?), and *Neritopsis*. In Woodward's 'Manual of the Mollusca' the *Naticidæ* inclued the genera *Natica*, *Sigaretus*, *Lamellaria*, *Narica*, and *Velutina*. Ninety recent species of *Natica* have been recorded. They are inhabitants of the Arctic

Seas, Great Britain, the Mediterranean and Caspian Seas, India, Australia, China, Panama, and the West Indies. The fossil species amount to 260.—*Eng. Cyc.*

Sigaretus has 26 recent and 10 fossil species.
Lamellaria has 5 recent and 2 fossil species.
Narica has 6 recent and 4 fossil species.
Velutina has 4 recent and 3 fossil species.

In Forbes and Hanley's 'British Mollusca' the following species of *Neritidæ* and *Naticidæ* are enumerated as British :—*Neritina fluviatilis, Natica monilifera, N. nitida. N. sordida, N. Montagui, N. Helicoides, N. pusilla,* and *N. Kingii.*

(5639) NERITIDÆ, a family of Holostomatous *Gasteropoda*, having the following characters :—Shell thick, semi-globose; spire very small; cavity simple from the absorption of the internal portion of the whorls; aperture semi-lunate; columellar side expanded and flattened; outer lip acute; operculum shelly, sub-spiral, articulated. At the end of the columella there is an oblong muscular impression, connected on the outer side by a ridge on which the operculum rests; within this ridge the inner layers of the shell are absorbed. Animal with a broad short muzzle, and long slender tentacles; food oblong, triangular; teeth 7, uncini very numerous. This family includes the genera *Nerita, Pileolus, Neritina,* and *Navicella.* Mr. Swainson places the family *Naticidæ* between his *Turbidæ* and *Trochidæ*, making it consist of the following sub-families and genera. His arrangement is, he says, founded on the shells only, from ignorance of the animals of the major part :—

Sub-Family 1. *Naticinæ* Sea-Snails.

Genera : *Natica*, Lam. (with the sub-genera *Naticella, Globularia, Mamillaria, Sigaretus, Naticaria, Lacuna, Leuctis*).

Sub-Family (?) *Neritinæ.* Nerits.

Genera : *Nerita*, Linn. (with the sub-genus *Neritopsis*, Gray); *Neritina*, Lam. (with the sub-genera *Clithon, Veloles* (*Velates*), *Pileolus,* and *Navicella*). ('Malacology.') Dr. J. E. Gray makes the *Neritidæ* the sixth family of his *Podophthalma*, and places it between the *Fissurellidæ* and the *Ampullariadæ*. Dr. Gray's *Neritidæ* comprise the following genera :—*Nerita, Pileolus, Culana, Neritina, Clithon, Dostia, Velates,* and *Navicella.* The genus *Nerita* is described separately. [NERITA.]

Neritina has the shell rather thick at the aperture, but extensively absorbed inside; outer lip acute, inner straight, denticulated; operculum shelly, with a flexible border; slightly toothed on its straight edge.

Pileolus has the shell limpet-like above, with a subcentral apex; concave beneath, with small semilunar aperture, and a columellar disc, surrounded by a broad continuous peristome. The species are only known as fossil. Upwards of 100 recent species of *Nerita* and 70 species of *Neritina* have been described. The fossil species of *Nerita* amount to 60, and of *Neritina* to 20. *Nerita* is found in the Lias, and *Neritina* in the Eocene Formation.

Navicella.—With the exception of the disposition of its operculum and of the muscles of attachment to the shell, the animal may be said to be nearly similar to that of *Nerita.*

The genus *Natica*, sometimes made the type of a family (*Naticidæ*), has been included with the *Neritidæ*. Messrs. Quoy and Gaimard remark, that the *Naticæ* are animals to which their foot gives a remarkable aspect. It is a long oval lamella, ordinarily squared in front, oval behind and doubled; anteriorly, where it is widest, it is a thick escutcheon, a little auriculated, which ascends on the front of the shell, which it covers, at the same time that it hides all the head of the animal, of which ordinarily nothing but the tentacles appear; a groove on each side indicates the two parts of the foot.

Natica Melanostoma has the shell oval, ventricose, convex-depressed thin, white, zoned with yellow; spire somewhat prominent; lip blackish-brown, umbilicus semi-closed. (Lam.) Length 15 lines; breadth $11\frac{1}{2}$ lines. Operculum membranous; paucispiral on the left border; the rest of its lamellæ obliquely transverse. Colour deep chestnut-brown lighter on the edge. It has been found at Tonga, the Moluccas, and many other places. Found by Messrs. Quoy and Gaimard some fathoms deep. Species of the genus have been captured creeping on the shore like the Nerits on rocks and sea weed, and from the surface to the depth of 40 fathoms on mud and sandy mud, in æstuaries and in tidal rivers.—*Eng. Cyc.*

(5640) NERIUM (from νηρός, humid, the habitat of the species), a genus of Plants belonging to the natural order *Apocynaceæ.* It has a hypocrateriform corolla, the orifice surmounted by lacerated multifid processes; segments of the limb contorted; the filaments are inserted into the middle of the tube; the anthers sagittate, adhering by the middle to the stigma; it has two ovaries, a filiform style dilated at the apex, and an obtuse stigma.—*Eng. Cyc.*

(5641) NERIUM ANTIDYSENTERICUM. (OVAL LEAVED) ROSEBAY TREE. *Apocynaceæ.* Linn. *Wrightia Antidysenterica.*

Veppalei maram, TAM. | Indurjau, HIND.

This common shrub flowers in April and May in terminal corymbs. The bark is used as an astringent.—*Riddell.* The wood of this tree is white beautiful, and fine grained; and is made into cabinets and elegant furniture.—*Ains. Mat. Med. p.* 209. Wight speaking of the Tamul-name says I take this name from Ainslie, but suspect it is another name for Kooda pallie, (which see) the Linnæan name belonging to a Ceylon plant, which I have not seen on the continent. The wood is said to be excellent for cabinet making purposes.—*Wight.* A shrub common in many parts of Hindostan. Its seeds bear some resemblance to oats, and are officinal at Lahore. They certainly merit the attention of European physicians, as they possess many medical properties.—*Honigberger, p.* 316.

(5642) NERIUM COCCINEUM, SCARLET OLEANDER. *Wrightia coccinea. Nerium coccinea.*

Scarlet Oleander, Soorookhkanel, HIND.

Common in gardens at Ajmeer and it is highly ornamental.—*Gent. Med. Top. p.* 186. In Tenasserim European compounds are occasionally scented with this useful shrub, whose orange-red flowers have the grateful fragrance of the pine apple.—*Mason.*

(5643) NERIUM GRANDIFLORUM.

Mendasinghi, HIND.

Double species cultivated by seed or cuttings. —*Riddell.*

(5644) NERIUM ODORATUM. OLEANDER.

Aralivayr, TAMIL.
Canner kajurr, DUK.
Ghennera vayroo, TEL.
Karrabeera, SANS. *Ainslie.*

This species has linear lanceolate leaves, three in a whorl; the segments of the calyx erect; appendages of the corolla filamentous; the anthers bearded at the point. The flowers red or white, with an agreeable musky scent. The bark of the root and the sweet-smelling leaves are supposed by native Indian doctors to act as powerful repellants applied externally. The root, taken internally, acts as a poison. (*Eng. Cyc.*), and is frequently resorted to, for the purpose of self destruction by the women of India when tormented with jealousy, the plant is the Beluttry-areli of the Hortus Malabaricus.—*Ainslie's Mat. Med. p.* 70. The root of the hill-plant is much more violent than that of the garden, and in the hills is considered poisonous. Jealous women so frequently have recourse to it that it is proverbial among the females of the hills, when quarrelling, to bid each other go and eat of the root of Kaneer.—*Honig, p.* 316. It is plentiful and very beautiful at Ajmeer. The single white is called sufaid-kurpud, the single rose-colored, lal-kurpud and the beautiful large double rose variety is called pudma-kurpud.—*Irvine, p.* 186.

(5645) NERIUM ODORUM. This well known fragrant flower adorns a few of the gardens in Maulmain, but it has not yet come into general cultivation.—*Mason.* It is cultivated in the gardens at Lahore, merely for its beauty. Its flowers, leaves, and roots, are officinal.—*Honigberger, p.* 326.

(5646) NERIUM OLEANDER.

Kar-Zuhra, HIND.

Common Oleander, has lanceolate leaves, three in a whorl being beneath, the segments of the corona trifid. It is a native of the Indies, in humid places, but has now become wild in the south of Europe, by the side of streams and the sea-coast. The flowers are rather large and of a bright-red colour. This species contains a great quantity of gallic acid, and a decoction of the leaves or bark forms an acrid stimulating wash, much employed by the poor people in the south of France to cure cutaneous disorders. The peasants in the neighbourhood of Nice use the powdered bark and wood of the Oleander to poison rats. Several cases are also recorded of death from having eaten meat roasted on a spit of Oleander wood. All the species of Oleander are very showy when in blossom. They thrive well in a light rich soil; and cuttings strike root freely in a moist situation. All of them require a good deal of heat to flower well in this country. (Don, *Dichlamydeous Plants*; Lindley, *Flora Medica;* Burnett, *Outlines of Botany.*)—*Eng. Cyc.* In the Dekhan, the Double Red and White grow wild on the banks of rivers, bearing both white and red flowers: the root is poisonous. There are two other varieties very commonly met with bearing double flowers both red and white, and by budding the red color on the opposite one in several parts of the same stalk, a very pretty appearance may be given to the shrub. The yellow congener is called the Exile—introduced I believe from America. Grows easily from cuttings.—*Riddell.*

(5647) NERIUM PISCIDIUM. Among the division of plants to which the Apocynaceæ belongs there are some which are most conspicuous for the strength of their fibres. These belong to two families of plants which are so nearly allied to each other, that they were united together by the celebrated Jussieu. Both are remarkable for abounding in milk juice; and some of them in caoutchouc, or some analogous products. Of these, the Apocynaceæ or Dogbanes are composed chiefly of trees and shrubs, of which the Oleander is a conspicuous example. But some are herbaceous, as in the case of the Vinca, or Periwinkle as it is called, which shows another characteristic, that is, the climbing habit of many of these plants, as well as the toughness of their fibre, as may easily be ascertained by trying to break any of the long, trailing twigs of this plant, so common in gardens and shrubberies. Among these, is a plant called *Nerium piscidium*, by Dr. Roxburgh, 'Fl Ind.,' ii, p. 7, common in the Khasya or Silhet Mountains, and there called *Echalat.* It there forms an extensive perennial climber. Its bark contains a large quantity of fibre, which the natives use for the same purposes as Hemp. Dr. Roxburgh, in steeping some of the young shoots in a fish-pond, n order to facilitate the removal of the bark and o clean the fibres, found that many, if not all the fishes, were killed. Hence the specific name which he applied. Dr. Wight has formed the plant into a new genus, Echaltum. It is probable that there are many other fibre-yielding plants n this family.—*Royle Fib. Pl. p.* 302.

(5648) NERIUM TINCTORIUM, WRIGHTIA TINCTORIA. ROSEBAY, BLUE DYEING ROSEBAY Roxb.

Pala mom also Palak, and Palavayrayunoo, TAM.
Tshil ankaloo, TEL.
Hayamaraka, SANS.

This species of Nerium which has been so accurately described by Dr. Roxburgh in the 1st Volume of the Oriental Repertory differs but in very slight degree from the Nerium Antidysenericum already mentioned and chiefly, by the atter wanting a nectarium. I find that the ndigo (0) yielding property of its leaves is well known to the Natives in many parts of lower ndia, and that particularly in Coimbatore, near Palachy much blue-dye is actually made from hem. Sir William Jones informs us, in the 4th Volume of the Asiatic Researches, that the Hindoo peasants of Bengal call this plant Nil (or Blue); a proof that they are perfectly acquainted with its peculiar qualities.—*Ains. Mat. Med. page* 195.

(5649) NETS.

Jhall, GUZ. & HIND.

Are rarely a subject of commerce, being almost ll manufactured by the fishermen and their amilies. This seems to be the universal practice. —*Faulkner.* Net making or the art in which he fabric is required to be transparent, but in which the fibres are decussated and retained in heir places by knots, that the interstices may etain their form and size, and prevent objects rom escaping, seems to have been known in the arliest ages in Egypt, and is practised with the greatest skill on the coasts of Bombay and of Scinde, as well as on the rivers of India. A reat variety of nets, from a few to fifty fathoms n length, are fully described in the "Illustrated Catalogue." Those from Singapore are interesting, as some are made with cotton, and others with the fibre which is very similar to, if not lentical with, that forming the so called China grass.—*Royle Arts &c. of India, page* 505.

(5650) NETTLE, a name applied to various plants. The true Nettles are various species of he genus *Urtica*, well known for their stinging properties, which are owing to the presence of an acrid poisonous secretion that in some Indian species is so dangerous as to cause excruciating pain and even death. Dead Nettles are species of *Lamium*, monopetalous plants belonging to *Labiatæ*, and wholly inert. The Nettle-Trees belong to the genus *Celtis*, also destitute of stinging properties, but having leaves resembling those of some kinds of *Urtica*. [URTICA; LAMIUM.] —*Eng. Cyc.* The great shrubby nettle (*Urtica crenulata*) is common at Chakoong in Sikkim: this plant, called "Mealum-ma," attains fifteen feet in height; it has broad glossy leaves, and though apparently without stings, is held in so great dread, that Dr. Hooker had difficulty in getting help to cut it down. He gathered many specimens without allowing any part to touch his skin; still the scentless effluvium was so powerful, that mucous matter poured from his eyes and nose all the rest of the afternoon, in such abundance, that he had to hold his head over a basin for an hour. The sting is very virulent, producing inflammation; and to punish a child with "Mealum-ma" is the severest Lepcha threat. Violent fevers and death have been said to ensue from its sting; but this he very much doubts. The stinging hairs are microscopic, and confined to the young shoots, leaf and flower-stalks. Leschenault de la Tour describes being stung by this nettle on three fingers of his hand only at the Calcutta Botanical Gardens, and the subsequent sneezing and running at the nose followed by tetanic symptoms and two days' suffering, nor did the effects disappear for nine days. It is, says Dr. Hooker, a remarkable fact that the plant stinks violently only at this season, I frequently gathered it with impunity on subsequent occasions, and suspected some inaccuracy in my observations; but in Silhet both Dr. Thomson and I experienced the same effects in autumn. Endlicher ("Lindley's vegetable kingdom") attributes the causticity of nettle-juice to bicarbonates of ammonia, which Dr. Thomson and I ascertained was certainly not present in this species.—*Hooker, Him. Jour.* Vol. II. p. 188. It will be remembered that in treating of Hemp, it was stated that it belonged to the natural family of the Nettles, or *Urticeæ*. These are widely diffused throughout both tropical and temperate climates, though they generally occur where there is considerable moisture either of soil or of climate. Though small and herbaceous in Europe, they grow to a gigantic size in the hot moist parts of Asia, and extend from its warm tropical islands, all along the Malayan Peninsula, to the foot of the Himalayas, and along which, and in its valleys, they flourish even near to the banks of the Sutlej. Species are also found around the Neilgherries, and along the Malabar coast to the Concan. Though the flowers of all are inconspicuous, some of the species (as *Urtica pulcherrima*) are remarkable for the beauty of their foliage; one of them (*U. tuberosa*) is distinguished by its tuberous rootstock, which is eaten by some of the natives of India, either in its raw or cooked state Every one, however, knows that the great characteristic of the Nettles is their sting. Some of the Indian species are remarkable, even among Nettles, for this quality; as, for instance *U. crenulata* and *U. heterophylla*, the latter "a most ferocious-looking plant." Many of the Nettles formerly placed in the genus *Urtica* have been removed to the genus *Boehmeria*, which includes what are sometimes called stingless Nettles. But many of each have long been famous for the tenacity of their fibre. Thus, of the European species, thread and cloth, as also paper, have been made from the fibre of the common Nettle (*Urtica dioica*). So, of the Siberian species, *U. cannabina*, thread and cord is made for the use especially of fishermen. In the Society Islands, also, cord is made with the fibres of *U. argentea*; and in Japan, the bark of the speies called *U. Japonica*, is employed in making lines, cordage, and cloth.

Himalayan Nettles.—Major Swetenham, when writing respecting the Maloo Creeper (*v.* p 296), thus mentions the large Nettle of Gurhwal —which he says is considered by the natives as superior to Bhang, or the true Hemp—"There is another plant that grows in the interior of the Hills from which stronger ropes even than the Hemp are said to be made—I allude to the large Nettle plant. I have seen this growing to the height of fourteen or fifteen feet; the Hill people in preparing ropes from this plant, steep it for *three* days *only* and then strip off the fibre; this is done in a contrary method to the Hemp stripping, *i. e.*, the top of the Nettle is broken off, and the fibre pulled down from the thin end." Capt. Huddlestone in his paper on the Hemp of the Himilayas, mentions also other fibres. Among these—"The larger Nettle called *Jurkundaloo, Kundaloo* and *Kubra*, grows chiefly in the northern parts of the district, in great quantities; it also grows in the middle ones; and from its fibre the natives make rope for tying up their cattle and snow-sandals. One bundle will produce about a seer of fibre, but it is not collected for sale. The plant grows about eight or nine feet high, and the stalks are about the size of a finger in thickness. It is cut in the cold season, and the stalks are soaked a few days in water before the fibre is stripped off from the thick end like Hemp."—('*Trans. Agri-Hortic. Soc.*,' viii. *p.* 275.) Dr. Campbell also mentions the gigantic stinging Nettle of the Nipal and Sikkim Hills, as made into Hemp and used in making the cloth called "Bangra." The preparation is the same as the "Pooah." The Bangra is harder and stiffer than the "Pooah," and not adopted to making cordage and nets.

Mr. C. Gubbins, C. S., when at Simla, forwarded some specimens of fibrous material produced by a species of Urtica growing about and below Simla, used by the natives of those parts for making string. The process, which he describes as employed for separating this fibre, is interesting from its simplicity. The plant is cut in October, and dried in the sun; when brittle it is beaten, and the fibres separate easily. He observes: "Seeing it stated that there was considerable labour required in cleaning the fibre, I made particular inquiries on this head; and as far as I can learn, there is no greater trouble in cleaning the fibre of the Urtica when merely dried, than is experienced with the Hemp of the Hills which is not rotted in water." Hence the separation would seem to be effected entirely by the dry process and mechanical means Capt Rainey, when Assist. Pol. Agent at Subathoo sent a net formed from the fibre of Stinging Nettle, which grows in the same locality as that described by Mr. Gabbins, and he says; "1*st.* The Nettles from which this sample was wove, grew in the low valleys adjacent to the Hil station of Simla in the Himalaya Mountains "2*d.* The vegetable abounds in all the ravines and valleys of those mountains, and forms one o the most rank weeds of these places, during the rainy months. "3*d.* In August and September when it is in perfection, it can be obtained in any quantity, running from five to six and seven fee in height. "4*th.* As far as I have been able t ascertain, it is chiefly in demand, if not at pre sent wholly so, for fishing nets; in consequenc of the virtue ascribed to the cord wove from it of gaining increased strength by constant immersion in water, and resisting decay from tha element longer than any other description o cords. "5*th.* The weed is known throughou the lower and centre ranges of the Himalaya by the names Babar, or Allow, or Bichoo; th last evidently consequent on its stinging propert being the common designation of the scorpion "6*th.* The following is the preparation t which the article is subjected by the native of the place; but I doubt not, much o the process might be omitted or simplified— "1*st.* Being cut in August or September, th weed is exposed for *one* night in the open ai "2*d.* The stalk is then stripped of leaves an dried in the sun. "3*d.* When well dried it i deposited in an earthen pot which contains water mixed with ashes (the refuse remains of an wood fire), and boiled four and twenty hour "4*th.* The stalk thus boiled is then taken to stream and well washed. "5*th.* The Hemp then brought home, and being sprinkled wit flour (otta) (of the grain called Koda), it is agai dried in the sun, and afterwards spun at an time into cord for nets of every description." A no distinctive characters are given of these Ne tles, it is impossible to determine the respectiv species. In Gurhwal and near Simla, *Urtic virulenta* and *U. heterophylla* are common stinging Nettles, as well as some others, whi of species of Boehmeria, the *B. frutescens*, *m crostachya*, *Goglado*, *salicifolia*, are found, an all probably abound in fibre, though a few on have been as yet ascertained to do so, as has been mentioned in the preceding pages.—*Royle Fib Plants.*

Nettle of Gurwal, grows there to the height of 14 or 15 feet and is used by the Hill people in making ropes.

Neilgherry Nettles.—The *Girardinia Leschenhaultiana*, is frequent all over the higher range of the Neilgherries: the bark yields a fine, strong, white flax-like fibre, which the hill people obtain by plunging the plant in hot water, to deprive it of its virulently stinging properties, and then peeling the stalks. The textile material so prepared is of great strength, and the Todawars use it as thread.

Nettle Fibre of the Neilgherry.—From Urtica Heterophylla, is supposed, to be still unknown in commerce. As yet it is only obtainable in small quantity but if called for, the supply might be largely increased as the plant is abundant and widely distributed over the Indian Peninsula. Is is separated by boiling the stalks. —*M.C.C.*

Nettle of the Boehmeria. See Boehmeria.

Strength of the Rheea and nettle Fibres. With regard to the strength of Nettle fibres, it has already been stated that Dr. Roxburgh found the Rami or Caloee bore 240 lb., when Hemp bore 158 lb. and Sunn 150 lb., Messrs. Sharp, in 1815, found a cord bore 252 lb, when Russian Hemp was only required to bear 82 lb. So in Dr. Royle's experiments with these fibres in an untwisted state, Petersburgh Hemp bore only 160 lb, when China-grass bore 250 lb., the Rheea 320 lb., and the Wild Rheea 343 lb. Mr. Henley had previously found the Kunkhoora or Rheea to bear about three times the weight of Russian Hemp. Capt. Thompson also thought it about three times as strong; and though rather too wiry, he considered it would make excellent cordage, as well as canvas. But though this is too valuable to be applied to such purposes, we have in the Wild Rheea equal strength with greater flexibility, and all that is required, as is apparent from the following abstract of the experiments made at Messrs. Huddarts's.

Experiments on Strength of Rope made from samples of Fibre of growth of India, received from Dr. Royle, at Messrs. Huddart's Rope manufactory, Limehouse, Feb. 13, 1854.

Description of Hemp.	Size of Rope.	Number of Yarns per strand.	Total number of Yarns in Rope.	Strength of Rope in pounds.	Strength of Rope per inch, circumf squared.	Size of Rope at breaking.	Tar absorbed.	Amount of stretching.
	Inc.							
Wild Rheea, 1st expt.	4⅞	44	132	19,032	*844	4⅝	1-7th	1 in 16
Ditto, 2d expt.	4⅞	44	132	21,025	*894	4⅜	1 7th	1 in 16
Rheea Fibre.	4⅜	44	132	20,488	*910	4⅜	1 9th	1 in 16

So Messrs. Morgan, having made some rope for Mr. Sangester with the Rheea sent him by Major Hannay from Assam, found it to be at least 50 per cent. better than similar rope made of Russian Hemp. This is conspicuous also in the following experiments. The excellence of the fibre for lines and fine cordage is particularly observable in the fine thread called *Talli Rami* from Singapore, as likewise in the delicate nets, some of which seem fine enough for lace instead of for catching fish. The fitness of the Wild Rheea, from its strength, flexibility, and durability, is seen in the various kinds of line and cord which Dr. Royle, has had made of it in this country, as well for fishing lines, as bowstrings, clew lines for hammocks, &c., in order to show its fitness for all and every purpose to which fibrous substances require to be applied. A subsequent report was made on the strength of these fibres, when twisted into cords and rope of different sizes. "In continuation of the experiments which I made on the strength of some Indian fibres in their untwisted state, I beg leave to subjoin an account of some others that I thought it desirable to have made on some of these fibres after they had been twisted into twine, cord, and rope, of different kinds, by a regular rope-maker. This I have had done in order to obviate the objections which are made against new articles by ignorance or prejudice, or from the opposition of interested parties. "These cords and ropes having been subjected to a fresh set of experiments and compared with others made of Russian Hemp and of as nearly as possible the same size, I am happy to report that in every instance the Wild Rheea has proved stronger than Russian Hemp, and in the case of the two-inch rope the Indian fibre bore 1000 lb. more than the Russian. The cultivated Rheea, which is equally strong, will, I hope, be applied to better purposes than rope-making; but it is important that the Wild Rheea is proved by these experiments to be fit for every purpose for which strong fibre is required, either in Europe or in India." A few experiments were also made with rope made of other Indian fibres. "Plantain and Pine apple fibres, though less strong, are capable of bearing considerable weights, and might be used for many ordinary purposes. But the tibre of the Agave, commonly called American Aloe, is capable of bearing a great strain, and the plants have the peculiarity of being able to flourish in a dry soil and climate, such as that of the Deccan and of Mysore. The Dhunchee fibre of Bengal, which is hardly known in Englnd, appears to be as strong as Russian Hemp, and is, I understand, as easily cultivated and as cheap as Jute. The results which have been obtained are as follows:—

		lb.
Wuckoo Fibre small Cord	... broke at	86
Petersburgh Hemp Cord	.. ..	170

Wild Rhea Cord. same size as Russian	190
Rhea Fibre Cord, one thread larger ...	230
Pound line of Wild Rheea	510
Six thread Cord of *Petersburgh Hemp* ..	505
Six-thread Ratline of Rheea, tarred ..	525
Six-thread do. of Wild Rheea, do.	530
Nine-thread do. of Wild Rheea, do. .	860
Twelve-thread do. of Wild Rheea do. ...	1129
One-inch Rope of Wild Rheea ...	1350
One-and-half-inch Rope of Wild Rheea, tarred	1900
One-and-half-inch Rope of Wild Rheea do.	1900
Two-inch Cord of *Russia Hemp*	1800
Two-inch Rope of Rheea Fibre tarred	2800
Twelve-thread Rope of Plantain made in India	864
Twelve-thread do. of Pine-apple do. ...	924
Two inch Cord of *Russian Hemp* ...	1800
Two-inch Rope of Dhunchee fibre, made in India	1850
Two-inch Rope of Agave, usually called Aloe do.	1900

For the sake of comparison we reprint the experiments made with the untwisted selvages of some of the same fibres, and of which the specimens were very carefully prepared by George Aston, and their strength tried in the office of the Military Stores.

Petersburgh Clean Hemp	broke with	160 lb.
A fibre from Travancore called Wukka	„	175
Yercum fibre	„	190
Jubbulpore Hemp	„	190
China grass, from China	„	250
Rheea fibre or China grass, from Assam	„	320
Wild Rheea, also from Assam	„	343
Hemp from Kote Kangra in the Himalayas, bore without breaking.		400 lb

The other tables, in which the strength of various Indian fibres is given, as tested by different experimentalists, are to be seen, of Pine-apple fibre of Agave. &c., of Moorva, of Plantain, of different fibres, of Sunn, Jubbulpore Hemp and Dhunchee fibre, of Himalayan Hemp, and other fibres, Mudar, of Rheea and other Nettles, under the head of Fibres. The Nettles species are conspicuous for Fibrous properties, each consisting of numerous individuals widely distributed, and easily cultivated. They appear useless only because so few take the trouble, or, we should rather say, enjoy the pleasure of reading the wide-spread book of Nature. When some of the improved methods of separating fibre are successfully applied to such plants as the Rheea and Wild Rheea, the benefits to India and the world will be incalculable. For they are exceeded by none in fineness, excel all others in strength, and may be fitly compared to the trunk of the elephant, which can pick up a needle or root up a tree.—*Royle, Fib. Pl. p.* 376.

(5651) **NEUROPTERA** (from νεῦρον, a nerve, and πτερόν, a wing), one of the orders into which the class *Insecta* is divided.—*Eng. Cyc.*

(5652) **NICANDRA PHYSALODES**, Gaertn. (Atropa physalodes, Linn.) is said to be diuretic.—*O'Shaughnessy, page* 466.

(5653) **NICKEL**, A brilliant white metal resembling silver: ductile and malleable, and capable of receiving a high polish. It is usually procured from speise, a compound of the metal with arsenic, found associated with cobalt in Germany. Alloyed with copper. it forms argentane or german-silver; and is besides used in making mariner's compasses, and for other purposes.—*Waterston. Faulkner.*

(5654) **NICOTIANA**, a genus of Plants belonging to the natural order *Solanaceæ*. The species of this genus are called Tobacco. Tobacco was the name used by the Caribbees for the pipe in which they smoked it, but this word was transferred by the Spaniards to the herb itself. The genus *Nicotiana* contains about 40 species, most of them yielding tobacco for smoking, and many of them cultivated in the gardens of Europe. The name *Nicotiana* was given these plants after Jean Nicot, of Nimes, in Languedoc, who was an agent of the king of the France at Portugal, and there procured the seeds of the tobacco from a Dutchman who had procured them in Florida. Nicot sent them to France in 1560. The species of *Nicotiana* are most of them herbs, rarely under shrubs, and generally clothed with clammy hairs or down. The flowers are terminal, racemose, or panicled, and of a white, green, or purplish colour. The Calyx is 5-cleft, permanent; corolla funnel- or salver-shaped, divisions 5, plicate and spreading; stamens 5, as long as the tube of the corolla; anthers dehising lengthwise; stigma capitate; capsule 2-celled, 2-valved, valves bipartite; seeds minute, numerous. In addition to those below there are several other species of tobacco which are used for smoking in the places where they naturally grow. *N. quadrivalvis* has capsules with four valves; it grows near the Missouri River, and is there smoked by the natives. *N. multivalvis* has capsules with many valves; it is cultivated by the Indians on the Columbia River, for smoking. It is a fetid plant, and the calyx, the most fetid part, is selected by the Indians for smoking. *N. nana*, a small species of tobacco, is a native among the Rocky Mountains of North America, and is smoked by the Indians. *N. repanda* is a native of Cuba, and is said to furnish the tobacco for making the small cigars known as Queen's.—*Eng. Cyc.* Tobacco leaves when properly dried have a greenish yellow colour, a strong pleasant smell, and acrid taste; taken into the stomach by persons not habituated to its effects violent vomiting, diarrhœa, and collapse are occasioned. The effects of smoking the leaf are too well known to require notice in our pages.—*O'Shaughnessy, page.* 471.

(5655) **NICOTIANA. MACROPHYLLA**, Orinoco Tobacco, is an herbaceous plant, wit ovate-acute leaves clasping the stem; throat o corolla inflated, segments short pointed. It is larger plant than the last, the stem rising fro 5 to 7 feet high. It is a native of America, an is frequently used for smoking, under the nam of Orinoco Tobacco: it is however inferior to th last ; the milder Havannah cigars are said to be made from it.—*Eng. Cyc.*

(5656) NICOTIANA PERSICA, Shiraz Tobacco, is an herbaceous plant, clothed with clammy down, with the leaves of the root oblong, those of the stem acuminate and sessile ; corolla salver-shaped, with a long tube, and rather unequal segments. This plant is a native of Persia, and furnishes the famous Shiraz Tobacco. This tobacco is milder than that produced by the N. *Tabacum*, and but a small quantity is consumed in England. The English smoke more of the strongest tobacco than any nation in the world.—*Eng. Cyc.*

(5657) NICOTIANA RUSTICA. English Tobacco, has an herbaceous square stem, with petiolate ovate quite entire leaves ; tube of corolla cylindrical, longer than the calyx ; segments of the limbs roundish, obtuse. This plant is a native of Europe, Asia, Africa, and America. It is called English Tobacco because it was the first species that was introduced into that country for growth ; it was then brought from America. It grows very well in that climate, and in some places is almost naturalised. It is known in France as Tabac Paussc, in Germany as Bauern-Tabak, and in Spain as Tabac Cimaroso. This plant grows on the coast of the Mediterranean, and thence finds its way into India, where it is highly valued. The tobaccos of Salonica and Latakkia, which are much esteemed, appear to be the produce of *N rustica*. From the extensive range of climate and difference of situation which this plant occupies, its characters suffer considerable change ; hence a number of varieties have been described. In the shops this tobacco is known as Turkish.—*Eng. Cyc.* Dr. Hooker writing of this species, says, To wind up the feast, we had pipes of excellent mild yellow Chinese tobacco called "Tseang," made from *Nicotiana rustica*, which is cultivated in East Tibet, and in West China according to M.M. Huc and Gabet. It resembles in flavour the finest Syrian tobacco, and is most agreeable when the smoke is passed through the nose. The common tobacco of India (*Nicotiana Tabacum*) is much imported nto Tibet, where it is called "Tumma," probably a corruption of the Persian "Toom-ack,") and is said to fetch the enormous price f 30s. per lb. at Lhassa, which is sixty times ts value in India. Rice at Lhassá, when cheap, ells at 2s. for 5 lbs. ; it is, as I have elsewhere aid, all bought up for rations for the Chinese oldiery.—*Hooker, Him. Jour. Vol.* 4, *page* 232.

(5658) NICOTIANA TABACUM. Common irginian or Sweet-Scented Tobacco, is an heraceous plant, with acuminated oblong-lanceolate ssile leaves, lower ones decurrent ; throat of orolla inflated, segments of the limb pointed. his plant is a native of the West Indies, where first became known to the Spaniards, and of irginia, where the English first became acquainted with its properties. Of the various species it is that which is most commonly cultivated in gardens as an ornament. It is also largely cultivated in Europe for the purpose of smoking. The other species are however in some cases preferred. Schrank has described a large number of varieties of the common tobacco, varying in the size and form of their leaves, as well as the colour and form of their corollas. This species is the one most commonly employed for making tobacco and cigars. [TOBACCO, in ARTS AND SC. DIA.]—*Eng. Cyc.* This remarkable plant we are informed by Mr. Royle, on the authority of the Persian works on Materia Medica, was introduced into India in A. H. 1014 (A. D. 1605) towards the end of the reign of Jelalooden Akbar Padshah. From India tobacco probably found its way to the Malayan Peninsula and China, though Royle quotes the authority of Pallas, Loureiro and Rumphius, who think tobacco was used in China at a period anterior to the discovery of the new world. —*Mason.*

(5659) NGAN-TSOING-SHA, a bast of Arracan.

(5660) NIGELLA (from *niger*, black, because of the colour of the seeds), a genus of Plants belonging to the natural order *Ranunculaceæ.* It has 5 coloured petal-like spreading sepals. The petals small, from 5 to 10, bilabiate, with a hollow nectariferous claw. The capsules more or less connected together, terminated by the elongated styles opening in the inside, many-seeded. The leaves are capillary, multifid, often surrounding the flowers like an involucre, and finely cut like fennel. The flowers are solitary on the tops of the stems or branches The species are erect annual smoothish herbs. The species are vulgarly known by the names Devil in a Bush and Devil in a Mist.—*Eng. Cyc.*

(5661) NIGELLA ARVENSIS, has pointed anthers ; from 5 to 7 styles circinately revolute, outwardly smooth ; capsules connected below the middle into an obconical fruit, which is narrowest at the base. It has a smooth stem, with diverging branches. It is a native of middle and southern Europe in corn fields, also in the north of Africa. The seeds are sometimes used instead of those of *N. sativa*, but they are not so aromatic, neither have they so pleasant a smell. Both species are employed in the adulteration of pepper. (Lindley, *Flora Medica* ; Fraas, *Synopsis Plantarum Floræ Classicæ.*)—*Eng. Cyc.*

(5662) NIGELLA HISPANICA. Some of the flowers are pretty, and only require to be sown in open ground, at the commencement of the rains, the colours are chiefly pale blue and yellow.—*Riddell.*

(5663) NIGELLA SATIVA. FENNEL FLOWER. Lin.

Carin siragum, TAM.
Kalunjen, DUK. & HIND.
Nulla Gilakara, TEL.
Musavi, SANS.

See article fennel flower seed, in Catalogue 1st section 1st —*Ainslie's Mat Med. p.* 262. *N. sativa* has ovate-obtuse anthers; capsules muricated, united up to the very point into an ovate fruit, terminated by 5 erect styles; the stem erect and rather hairy; flowers naked. The seeds are angular, aromatic, subacid, and were formerly used instead of pepper: and have also been employed as carminatives. It is the Μελάνθιον of Hippocrates, 'Steril,' 675, and of Dioscorides, 3, 93; the Githex of Pliny, 20, 17.—*Eng. Cyc.* This plant is a native of the south of Europe. Egypt, Barbary, and the Caucasus, and is extensively cultivated in India. The *Seeds*, resembling coarse gunpowder, are triangular, slightly compressed, obtuse above with oblique bases, rugose, black externally, internally of a greenish white hue. The capsules are polyspermous, oblong, and pointed at the side. The seeds are of strong aromatic odour, and flavour resembling sassafras or cubebs. These properties are due to an essential oil, of which the seeds yield from 5 to 10 per cent. The nigella seeds have been long used in medicine, and are praised by Hippocrates as a tonic condiment. At present they are chiefly employed by the native Hakims as Baidas aromatic adjuncts to purgative or bitter remedies. In Bengal they are given to nurses, in the belief that they increase the secretion of milk, and facts have been laid before us which tend to corroborate that opinion. In eruptions of the skin, Dr. Ainslie informs us, the seeds reduced to powder and mixed with sesamum oil, are much used as an external application. The seed will seldom be prescribed in substance. The tincture is a useful, warm stimulant, and may be added conveniently to numerous draughts and mixtures intended for other purposes. The popular mode of giving the nigella to nurses is by mixing the powdered seed with curry, to which however it communicates a very heavy and disagreeable flavour. The price of the seed in the bazars is from one to two annas the seer,=2lbs., avoirdupois.—*O'Shaughnessy, page* 164. The tincture of it is stimulant and diaphoretic, and is recommended by native practitioners to promote the secretion of milk. Dose, half a fluid drachm to two drachms.—*Beng. Phar. page* 430.

(5664) NIGELLA SEED, KOLINJEE SEED. NIGELLA SATIVA. SMALL FENNEL FLOWER SEED. SYN.

Siah daneh, PERS.
Kala-jira, HIND.
Μελανθιον of Dioscorides.
Shoonez, ARAB.
Mugrela, BENG.
Kaloodooroo, CYNG.
Kolunjun, DUK.
Hab Saude, EGYPT.
Gemein Nigelle, GER.
Krishna jiraka, SANS.
Carin Siragum, TAM.
Nulla gilakara, TEL.
Kolinjee, Kalee jeera, GUZ. HIND.

These seeds have a great resemblance to coarse gunpowder, are triangular, slightly compressed, obtuse above with oblique bases, rugose, black externally, internally of a greenish white hue. They have a strong aromatic odour, and flavour resembling sassafras or cubebs. They are used in medicine by the natives, as an aromatic adjunct to purgative or bitter remedies; and also in curries and pickles. The plant (*Nigella Sativa*), is a native of the South of Europe, Egypt, Barbary, and the Caucasus, and is extensively cultivated in India.—Produced in various parts of the Western Presidency; and exported from Bombay to London and France. —*Faulkner.*

(5665) NIGHT BLOWING CEREUS. Cereus.

(5666) NIGHTINGALE. Dr. J. D. Hooker, in this most interesting work on the Sikhim Himalaya, twice notices "the Nightingale," as having been heard by him; but at a time of the year at which no real Nightingale ever sings. Every one familiar with the true Nightingale knows that it regularly ceases to sing, somewhat abruptly, about the beginning of the month of June, and this alike whether it has young to tend in the wild state, or when confined in a cage; and captive Nightingales recommence their song, if in health and vigour, about January, and continue in full song for two months or more before their wild brethren arrive from their southern haunts. This bird never sings out of season. Accordingly we have no hesitaiton in declaring that Dr. Hooker's "Nightingale" refers to some other bird, and most probably to the Shama. "On the 4th October," he remarks, "I heard the Nightingale for the first time in the season;" and when at Pemiongchi (a former capital of Sikhim), in January, he notices that "Nightingales warble deliciously night and morning, which rather surprised us, as th minimum thermometer fell to 28°, and th ground next day was covered with hoar frost These birds migrate hither in October and November, lingering in the Himalayan valleys til the cold of early spring drives them furthe south, to the plains of India, whence they retur north in March and April." Among the numerous collections of Sikhim birds which w have examined, no specimen of a Nightingale ha ever occurred: nor is the bird enumerated i Mr. Hodgson's lists of the species inhabitin that region.—*Bligh.*

(5667) NILGHAU OR NYL-GHAW, Por TAX TRAGO-CAMELUS, one of the largest an most magnificent of known antelopes being u wards of 4 feet high at the shoulder; resides i the dense forests of India, is a vicious animal very uncertain temper, and even when domest cated from both, is violent and changeable.

(5668) NIMA, a genus of Plants belongi to the natural order *Simarubaceæ.* It has be maphrodite flowers, a 5-parted permanent calyx, 5 oblong petals, 5 stamens with filaments dilated at the base; the 5 ovaries are connected together, pilose, and seated on the thick disc beneath the petals. The embryo is large, without albumen. The species are trees, with alternate imparipinnate leaves, having four parts of serrated leaflets. The flowers are disposed in panicle corymbs.—*Eng. Cyc.*

(5669) NIMA QUASSIOIDES, is a native of Nepaul, in a valley near the town called Thankot. It has elliptical oblong leaflets, which are acuminated and serrated. The corymbs are trichotomous. It is as bitter as the quassia of South America. (Don, *Dechlamydeous Plants*: Lindley, *Flora Medica.*)—*Eng. Cyc.* It grows at foot of the Himalaya mountains of which it rises to near the snow line: The wood has long been used for killing insects, and latterly recommended in fever by M. Macardieu.—*Ind. An.* 106.

(5670) NIPA FRUTICANS. This a low stemless palm that grows in the tidal waters of the Indian ocean, and bears a large head of nuts. It is a plant of no interest to the common observer, but of much to the geologist, from the nuts of a similar plant abounding in the tertiary formations at the mouth of the Thames, and having floated about there in as great profusion as here, till buried deep in the salt and mud that now forms the island of Sheppy.—*Hooker, Him. Jour. Vol.* I. *page* 1. The "Nipa" and "Sasa" of the Philippine islands possesses various useful purposes. It is the *Nipa fruticans* of botanists, and has affinities with the screwpines. The leaves are used for thatch baskets or when burnt, they yield salt: and toddy a palm wine is extracted from the spathe, convertible into syrup, sugar, vinegar, yeast and a strong spirit.—*Seeman.* The Nipah Palm from the appearance of its foliage, is generally supposed to be a Palm; though stemless, but in the nature of its flowers, it approaches the Screw Pines and is a plant of which the leaves are applied to mat making and thatching. It is a native of the Indian Archipelago, which extends northwards to the Mergui River, where it is found in perfection, but only a few specimens as far north as Moulmain. It flourishes in brackish water, along with he Mangrove, and its lower parts are inundated when the tide rises. It abounds in saccharine ap, which may be evaporated into an excellent ugar, or fermented into a kind of 'Palm wine." ts leaves are those chiefly employed in the Teasserim Provinces for covering the roofs of ouses, and large quantities are sent northwards rom Mergui for this purpose. They are also made into mats, and no doubt abound in fibre, hough this is not separated for economic puroses.—*Royle Fib. Plants, p.* 35. The nipa s very extensively cultivated in the proince of Tavoy. From incisions in the stem of the fruit, toddy is extracted, which has very much the flavour of mead, and this extract when boiled down becomes sugar. In Burmah, where the palmyra abounds, an extract from that tree is made to supply its place.—*Mason.* Writing of this plant Dr. Hooker says " Receding from' the Megna, the water became salter, and *Nipa fruticans* appeared, throwing up pale yellow-green tufts of feathery leaves, from a short thick creeping stem, and bearing at the base of the leaves its great head of nuts, of which millions were floating on the waters, and vegetating in the mud. Marks of tigers were very frequent." *Hooker, Him. Jour. Vol.* II. *page* 355.

(5671) NITRE. NITRAS POTASSÆ, NITRATE OF POTASH. *Nitrum. Salpetræ. Salpetre F.* Nitrate de Potase. Nitre. *G* Salpeter Salpetersaures Kali. Nitrate of Potash (K O, N = 102), Nitre, or Saltpetre, being a production of nature, must early have been known, especially as both the Indians and Chinese have long been acquainted with the making of fireworks, and the former have an easy process for making Nitric acid, in which they have been followed by Geber and other Arabian authors. The names *neter* in the Old Testament, and *nitrum* in ancient authors, were applied to Carbonate of Soda, but they were also used in a generic sense. Nitre is found effloresced on the soil in many parts of India, where there is no animal matter, and being washed out, a fresh crop is formed after a few years. The soil is sandy, with mica interspersed, which will continue to yield a supply of Potash, while the Nitric acid must be furnished by the combination of the Oxygen of the atmosphere with its Nitrogen, probably, as suggested by Liebig, by the oxidation of the Ammonia which he has proved is always present in the atmosphere. Mr. Stevenson (Prinsep's Journ. ii. p. 23) has detailed the process, and shown that the saline earth contains of salts soluble in water, Sulphate of Soda, Muriate of Soda, Nitrates of Lime and of Potash. The Nitrate of Lime is easily converted into that of Potash by lixiviating the saline soil over a filter of woodashes, which contains Carbonate of Potash (the Carbonic acid combines with the Lime, and the Nitric acid with the Potash), a Carbonate of Lime is precipitated, and the Nitrate Potash in solution is evaporated and put aside to crystallize. The salt obtained contains from 45 to 70 per cent. of pure Nitrate of Potash. It is redissolved and crystallized, but still contains impurities, which are termed so much per cent. of *refraction.* The ordinary kinds are called *rough* or *crude* Saltpetre, and the purer *East India refined.* In Europe Nitre is prepared artificially, in Nitre-beds or Nitre-walls, and in ditches covered by sheds, where urine is added to different mixtures of earth with refuse vegetables, various animal substances, and calcareous matter, &c. The whole is exposed to the action of the air. The Nitrogen, combining with the Oxygen, forms Nitrates, and the foregoing processes being adopted, similar results are obtained *Prop.* Nitrate of Potash in its purified state is colourless and semi-transparent, without odour, of a sharp and cooling, disagreeable, saline taste; crystallized usually in long, striated six-sided prisms, terminated at each extremity with dihedral summits, or in two or six converging planes, sometimes in a dodecahedron formed of two six-sided pyramids joined base to base. The crystals are anhydrous and unalterable in the air. Sp. Gr. 1.62. Soluble in 4 parts of water at 60° producing cold, and in an equal weight of boiling water. Insoluble in Alcohol, and sparingly so in diluted Alcohol. Heated to about 660°, it melts into a transparent fluid; in cooling, it forms a white semi transparent mass, which used to be called *Sal Prunellæ* when run into small balls. By a high degree of heat, Nitre is decomposed, Oxygen gas being first given off, and afterwards mixed with Nitrogen, while Hyponitrite of Potash is left behind. Water is apt to be lodged between the plates of the crystals, particularly when these are large; hence in gunpowder manufactories, small crystals, if equally pure, are preferred. With inflammable substances the decomposition of Nitre, when heated, is rapid, light and heat being disengaged, constituting what is called the deflagration of Nitre. This takes place also with some of the compound acids, into which Carbon enters as a constituent. Nitre being required of the best quality for the manufacture of gunpowder, that of commerce is usually sufficiently pure for medical purposes. But it sometimes requires purification to the extent of a single solution, and re-crystallization, as in the D. formula.—*Royle.*

(5672) NITRAS POTASSÆ PURIFICATUM, D. PURIFIED NITRE. *Prep.* Take *Nitr. Potash* one part, *boiling water* two parts, dissolve, remove the scum, filter, set aside for crystals to form. *Tests.* The presence of Nitric acid and of Potash may be detected by their respective tests. Nitre should be entirely soluble in distilled water. The solution should not be affected by Chloride of Barium (no Sulphates), nor by Nitrate of Silver (no Chlorides). Calcareous salts which occur only in rough Nitre, may be detected by the Oxalate of Ammonia, throwing down a white precipitate of Oxalate of Lime. Sulphate of Potash is now seldom found in the best Nitre, and only a small proportion of Chloride of Potassium or of Sodium.—*Royle.*

(5673) NITRATE OF SODA, CUBIC NITRE.

Nitrate de Soud, FR.
Wurfelsalpetre, GER.

Consists of nitric acid and soda. It is similar in its properties to saltpetre, differing chiefly in being more pungent in taste, more soluble in cold water, more inclined to attract moisture from the atmosphere, and in crystallizing in a rhomboid form. It is highly esteemed as a manure for pastures, and for all other sorts of agricultural produce, except that grown in heavy wet soils. It is also applied to many of the purposes for which saltpetre is used, though being more deliquescent than that salt, it is not adapted for the manufacture of gunpowder. This salt is found in immense quantities in deposits in South America, particularly in the districts of Atacama and Tarapaca in Peru.—*Waterston. Faulkner.*

(5674) NITRIC ACID, AQUA FORTIS. Acidum Nitricum, L. D Acidum Nitricum purum, E. Nitric Acid, *Aqua Fortis. Spiritus Nitri Glauberi.*

Maulabker, ARAB.
Vediloonoorasa, CYNG.
Sterk water, DUT.
Acide nitrique, FR.
Salpeter saure, GER.
Sooriakhar-ka teil, HIND.
Shore ka tezab, HIND.
Uruk-i-shora, PERS
Aqua forte, PORT.
Acidum Nitricum, Aqua fortis, LAT.
Pottle Ooppoo travagum, TAM.

Nitric Acid (N or $NO_5 = 54$) is a compound of Nitrogen acidified by Oxygen. It was known to Geber, and probably also to the Hindoos. Cavendish first clearly ascertained its composition by forming the acid by passing electric sparks through atmospheric air over a solution of Potash. Phil. Trans. vol. 75, p. 572, and vol. 78, p. 261. (1785.) It may frequently be detected in the atmosphere after thunder-storms, in consequence of the Oxygen and Nitrogen combining together with the aid of electricity. In combination with Potash, Soda, and Lime or Ammonia, it is found, effloresced on the soil in some countries; also in some minerals; likewise in some vegetables, as in the officinal Pareira root, in the state of Nitrate of Potash. *Prop.* Nitric is unknown anhydrous, being always seen as a liquid in combination with water. When pure, it is colourless, transparent, of a very sour corrosive taste, destroying vegetable and animal matter. It tinges the skin yellow, and causes it to peel off; gives acid properties to a large quantity of water, vividly reddening Litmus and vegetable blues. It has a strong, almost suffocating odour, fumes in the air, from condensing its moisture; fumes still more if Ammonia be present. Its affinity for water is great, absorbing it from the air, and having its Sp. Gr. and strength diminished; when mixed with it, heat is evolved. Its strength necessarily depends on the quantity of water mixed with it; the density of the L. P. acid is 1·5033 to 1·504; Mr. Phillips considers this to be the strongest procurable; but it has been brought, by distilling with a gentle heat, by Kirwan to 1·55, and by Proust to 1·62. The E. P. also employs the Nitric acid of commerce, commonly called Aqua Fortis, of Sp. Gr. 1380 to 1390. Dr. Christison considers 1500 as the densest acid which can be obtained free of Nitrous Acid, but, impregnated with this, it may be got so heavy as 1540 and upwards. The purest Nitric Acid, if long exposed to light, becomes yellowish from decomposition, Oxygen being given out, and Nitrous Acid formed. This may be got rid of by the action of heat, as it escapes in the form of Nitrous acid fumes, leaving the Nitric nearly colourless. Nitric Acid of Sp. Gr. 1·50 will freeze at −40° and will boil at 247°, but these points vary of course with the density; if the heat be continued, the acid volatilizes, and at a red heat is decomposed. At the density of 1.5 it consists of 1 Eq. of Nitric and $1\frac{1}{2}$ Eq. of Water, or $54 + 13\cdot5 = 67\cdot5$, and it then contains about 80 per cent. of acid. Many vegetable substances, as Charcoal, Sugar, Alcohol, deprive Nitric Acid of its Oxygen, also Phosphorus, and hence it is one of the most powerful oxidizing agents. The Metals do not in general decompose it when concentrated, but if diluted with water, this becomes decomposed as well as the acid, both yielding Oxygen to oxidize the Metal; the oxide is insoluble, or, being acted on by some of the undecomposed acid, a Nitrate is formed. The other part of the decomposed acid escapes in the form of Nitric oxide gas, which, uniting with Oxygen of the atmosphere, ruddy fumes of Nitrous acid gas are observed. If Copper filings be used, then the solution will be of a greenish-blue colour. If Hydrochloric Acid be mixed with the Nitric, both become decomposed, and the mixture, called Nitro-Muriatic acid or *Aqua Regia*, is capable of dissolving gold. The presence of Nitric Acid may be ascertained by the bright red colour produced when it touches Morphia or Brucia; saturated with Carb. of Potash, it forms Nitrate of Potash, which deflagrates. *Prep.* Nitric Acid may be formed by passing electric sparks through a mixture of 1 part of Nitrogen and 5 of Oxygen. The L. and E. P. direct *Nitrate of Potash* and *Sulphuric Acid* in equal quantities by weight to be mixed together in a glass retort, and the resulting Nitric Acid to be distilled in a sand-bath (or by a naked gas flame, E). The D. P. employs 100 parts of salt to 97 of common Sulphuric Acid. To obtain a pure acid, the E. P. directs the Nitrate of Potash to be purified by two or three crystallizations, till Nitrate of Silver does not act on its solution in distilled water. When manufacturers make Nitric Acid they employ only half the quantity of Sulphuric Acid and use Nitrate of Soda instead of Nitrate of Potash, because it is cheaper. The acid obtained is of a brownish colour, fumes, and is called Nitric acid of Commerce.—*Royle.* When pure, it is colourless, but as met with in commerce, it is yellowish, owing to its containing nitrous acid in solution; besides which it is often highly diluted, and mixed with sulphuric and muriatic acids. It is exceedingly corrosive, and its taste is sour and acid. Nitric acid is employed in a great variety of chemical processes; in metallurgy and assaying, for etching on iron and copper, in dyeing and in medicine.—*Faulkner.*

(5675) NITRO-MURIATIC ACID. ACIDUM NITROMURIATICUM, D. Acidum Nitrohydrochloricum. Aqua Regia.

Eau regale, FR. | Konigswasser, GER.

This acid is made by mixing Nitric Acid with Muriatic, and has probably been known since the discovery of these acids. The Arabs must have been acquainted with it, as they had a solvent for Gold. *Prop.* Nitrohydrochloric Acid is of a golden yellow colour with the suffocating odour of Chlorine, and the irritant corrosive properties of the strong acids. *Prep.* Mix gradually in a cooled vessel, and where the fumes can easily escape. *Nitric Acid* 1 part, *Muriatic Acid* 2 parts (both by measure). Keep the mixture in a well-closed bottle in a cool, dark place. The resulting acid is not a mere mixture of the two acids, for both become decomposed. It is distinguished by the property of disolving gold.—*Royle.*

(5676) NIZAM-OOD-DEEN AOLEEA, is a spot near Delhi where visitors used to witness some excellent feats performed by a number of swimmers, who jump into a large reservoir from a dome about fifty or sixty feet above the surface of the water.—*Tour in India by French. p.* 11.

(5677) NOLANA (so named by Linnæus, from 'nola,' a little bell, on account of the bell-shaped form of the corolla), a genus of Plants belonging to the natural order *Nolanaceæ.* It has a 5-cleft calyx; a campanulate 5-lobed 5-plicate corolla; 5 stamens adhering to the tube of the corolla, nearly equal; the anthers are 2-celled, dehiscing lengthwise. The seeds are roundish, with a membranous testa, and fleshy copious albumen. The species are herbs; natives of Peru and Chili; usually annual. Leaves alternate, quite entire. The flowers are solitary, pedunculate, and of a showy blue colour. The species of *Nolana* are only valuable as ornamental plants, they are showy when in blossom, and are much like some of the trailing species of *Convolvulus.* The seeds should be sown in a gentle hot-bed in the spring, and the plants when of sufficient size, or about the middle of May, should be finally transplanted to the open ground, where they will flower and ripen seed; or the seeds may be sown at once in the open border in a warm sheltered situation.—*Eng. Cyc.*

5678) NOLANA GRANDIFLORA. Trailing annual plants with white, yellow and blue flowers, easily raised from seed, in any garden soil.—*Riddell.*

(5679) NOLE-COLE, must be sown exactly in the same manner as that recommended for cabbage, broccoli, &c. It comes in early, and remains in season until April. If watered during the hot weather and taken care of, it will, when the rains commence, throw out sprouts, and form other knole-eole on the old stalk, which may either be used, or slipped off and planted: they will not be so fine as those raised from seed, yet are fit for use.—*Jaffrey.*

(5680) NONEA ROSEA. BORAGINEÆ. These are plants of no great beauty and may be raised in common grden soil.—*Riddell.*

(5681) NOOCHIE OIL, VITEX NEGUNDO.

(5682) NOONA BARK, MORINDA UMBELLATA. The *Noona Dye* is famous in Tanjore and the plant is grown in large quantities, the colour red but not so bright as that extracted from the Imboora, which is exported to Madura and with it the famous Madura turbands are dyed.—*M. C. C.*

(5683) NORFOLK ISLAND PINE. Araucaria excelsa, grows also in New Calidonia, Botany Island, Isle of Pines; a majestic tree growing to the height of from 60 to 228 feet, with a circumference of 30 feet. Its wood is useful for carpenters in-door-work but is too heavy for naval purposes as spars.

(5684) NUCIFRAGA, a genus of Birds known by the name of Nutcracker. One species is a native of Britain. This genus is generally considered to comprehend only two known species: *N. Caryocatactes* and *N. hemispila*, which bears a considerable resemblance to it, though it is clearly a distinct species, described and figured in Mr. Gould's 'Century of Birds from the Himalayan Mountains.' Prince C. L. Bonaparte and Mr. Audubon, include the *Corvus Columbianus* of Wilson in the genus *Nucifraga.*—*Eng. Cyc.*

(5685) NUGAR-MOTHA, Cyperus pertenuis. Very common at Ajmeer: the root has a pleasant smell: used in hair mesalihs: also considered astringent and to check diarrhœa: one tola is given.—*Gen. Med. Top. p.* 147.

(5686) NUL OR NAR. Native name of a Bengal grass of which the mats known as "Durma," are made.

(5687) NUMMULITE.

Shudnaj udsee, ARAB.

Officinal with the natives. They are lentil-shaped greyish pebbles, of various sizes, consisting of carbonate of lime and iron (with a nucleus of calcareous crystals, Royle). The Hakims administer them in eye-diseases, and ulcers.—*Honigberger.*

(5688) NURTIUNG IN THE JYNTEA HILLS. The Nurtiung Stonehenge is no doubt in part religious, as the grove suggests, and also designed for cremation, the bodies being burnt on the altars. In the Khasia these upright stones are generally raised simply as memorials of great events, or of men whose ashes are not necessarily though frequently, buried or deposited in hollow stone sarcophagi near them, and sometimes in an urn placed inside a sarcophagus, or under horizontal slabs.—*Hooker Him. Jour. Vol.* II. *page* 320. The usual arrangement is a row of five, seven, or more erect oblong blocks with round heads (the highest being placed in the middle), on which are often wooden discs and cones: more rarely pyramids are built. Broad slabs for seats are also common by the wayside. Mr. Yule, who first drew attention to these monuments, mentions one thirty-two feet by fifteen, and two in thickness; and states that the sarcophagi (which, however, are rare) formed of four slabs, resemble a drawing in Bell's Circassia and descriptions in Irby and Mangles' Travels in Syria. He adds that many villages derive their names from these stones, "mau" signifying "stone:" thus "Mausmai" is "the stone of oath," because, as his native informant said, "there was war between Churra and Mausmai, and when they made peace, they swore to it, and placed a stone as a witness;" forcibly recalling the stone Jacob set up for a pillar, and other passages in the old Testament. "Mamloo" is "the stone of salt," eating salt from a sword's point being the Khasia form of oath; "Manflong" is "the grassy stone," &c. Returning from this grove, we crossed a stream by a single squared block, twenty-eight feet long, five broad, and two thick, of gray syenitic granite with large crystals of felspar.—*Hooker Him. Jour. Vol.* II. *page* 320. Notes on the Khasia mountains and people; by Lieutenant H. Yule, Bengal Engineers. Analogous combinations occur in the south of England and in Brittany, &c., where similar structures are found. Thus *maen, man* or *men* is the so-called Druidical name for a stone, whence *Pen-maen-mawr*, for "the hill o the big stone, Maen-hayr, for the standin stones of Brittany and Dalmen, the table ston of a cromlech."—*Hooker Him. Jour: Vol.* II. *p* 321.

(5689) NUTMEGS.

Jowzalteib, ARAB.
Bu-wah-pa, BALI.
Jayaphala, BENG.
Jatipullum, Sadikka, CYNG,
Jaiphul, DUK.
Muskaatnoten, DUT.
Muscades Noix muscades, FR.
Muskatennusse, GER.
Jaiphul, GUZ HIND.
Noce moscada, IT.
Woh-pala, JAV.
Buah-pala, MAL.
Jowz bewa, PERS.
Noz moscada, PORT.
Jati-phala, SANS.
Jadicai, TAM.
Jajikaia. TEL.
Faulkner.

The importance of this spice, requires that th opinions of various writers should be recorded. Dr Hassall says there are three species of Myristica which furnish nutmegs. That which yields the bes description, Myristica fragrans, forms a tree fro twenty to twenty-five feet high, somewhat simila in appearance to a pear tree. The fruit is smooth externally pear shaped, and about the size of a ordinary peach. It consists, first of an oute fleshy covering, called the pericarp, which when mature separates into nearly equal longitudinal parts, or valves, secondly, of the aril, or mace, which, when, recent, is of a bright scarlet colour; and thirdly, of the seed proper, or nutmeg. This is enclosed in a shell, which is made up of two coats, the outer is hard and smooth, the inner, thin, closely invests the seed sending off prolongations which enter the substance of the seed and which being coloured, impart the marbled or mottled appearance characteristic of nutmeg. Nutmegs are cultivated in the Molucca Islands, nd especially in those called the Banda, or Nut-neg Islands. It is also grown in Java, Suma-ra, Penang, Singapore, Southern India, Bengal, Bourbon, Island of Madagascar, and certain of heWest India Islands. There are two kinds of nut-negs met with in commerce. The first, called the rue, round, cultivated, or female nutmeg, is the roduct of Myristica fragrans. These nutmegs are haracterised by their full and rounded form and lelicate and aromatic flavour; they are occasion-lly imported in the shell. There is also a small ariety, not larger than a pea, which has been escribed under the name of the royal nutmeg. 'hree varieties of true nutmeg are distinguished y dealers, which are thus described in Pereira's Materia Medica:"—

1. "*Penang nutmegs.*—These are unlimed or rown nutmegs, and fetch the highest price. They are sometimes limed in Britain for exporta-ion,as on theContinent the limed sort is preferred. ccording to Newbold, the average amount an-ually raised at Penang is 400 piculs (of 13½ s. each).

2. "*Dutch or Batavian nutmegs.*—These are med nutmegs. In London they scarcely fetch high a price as the Penang Sort.

3. "*Singapore nutmegs.*—These are a rough-r, unlimed, narrow sort, of somewhat less value han the Dutch kind. According to Mr. Oxley, ,085,361 nutmegs were produced at Singapore 1848, or about 252 piculs (of 133½ lbs. each); ut the greater number of the trees had not ome into full bearing, and it was estimated that e amount would in 1849, be 500 piculs. The cond kind of nutmeg is called the false, long, ild, or male nutmeg, and is the produce chiefly Myristica fatua; but a kind of nutmeg which is so called wild, is obtained from Myristica Mala-rica. The seeds of Myristica fatua, are about half long again as the true or round nutmeg; they e paler, and less aromatic. The wild nutmeg tained from the Myristica Malabarica has arcely any flavour or odour, and, according to heede, is of the size and figure of a date "The rkish and Jewish merchants," writes Rheede mix these nutmegs with the true long ones, d the mace with good mace, selling them to-ther. They also extract from these inferior ticles an oil, with which they adulterate that a more genuine quality." In the Banda Islands, three crops or harvests of nutmegs are obtained in the year, the principal gathering is in July or August: the second in November; and the third in March or April. The fruit is gathered by means of a barb attached to a long stick; the mace is separated from the nut and separately cured. On account of their liability to the attacks of an insect known as the nutmeg insect, considerable care is required in drying them. They should be dried in their shells, as they are then secure from the insect. They are placed on hurdles, and smoke-dried over a slow wood fire for about two months. In the Banda Islands, they are first dried in the sun for a few days. When the operation of drying is complete, the nuts rattle in their shells; these are cracked with mallets, and the damaged, shrivelled, or worm-eaten nuts removed. To prevent the attacks of the insect, the nuts are frequently limed. For the English market, however, the brown or unlimed nutmegs are prepared. The Dutch lime them by dipping them into a thick mixture of lime and water, but this process is considered to injure their flavour. Others lime them by rubbing them with recently-prepared, well-sifted lime. This process is sometimes practised in London. The following account is extracted from McCulloch's Dictionary of Commerce, *of the Quantities of Nutmegs entered for Home Consumption in the United Kingdom, in* 1840, 1841, 1842 *, and the amount of Duty received thereon.*

Quantities.		Duties.		
	lbs.		£.	*s.*
1840	118,664	1840	15,041	9
1841	113,441	1841	14,851	10
1842	170,064	1842	22,018	12

In 1842, the duties were fixed at 3*s.* 6d per lb. on those from a foreign, and at 2*s.* 6*d.* per lb. on those from a British possession. The duty on wild nutmegs in the shell was then also fixed at 3*d*, without regard to origin. The duty now is 1*s.* per lb; on wild nutmegs in the shell, 3*d.* per lb., not in the shell, 5*d.* per lb. Wholesale price, 1*s.* 9*d.* to 4*s.* Were entered for home consumption in 1852, 239, 200 lbs.; in 1853, 208, 198 lbs. It appears from Dr. Hassall's inquiries, 1st. That nutmegs, as they reach the consumer are not in general deprived of their essential oil; a result contrary to the opinion commonly entertained on this point. 2nd. That, as met with in the English markets, they are seldom limed.—*Food and its adulteration, p.* 408. Crawfurd says the species of the genus Myristica are numerous and wide-spread, for some are found in all the islands of the Archipelago, in several parts of Hindustan, in the Hindu-Chinese countries, in the Philippines, in Australia, and in tropical America. As a spice, however, the moschata or aromatic, is the only one of which the nut or mace is of any value, and of this the geographical limits are comparatively narrow, being comprehended between the 126th and 135th degrees of east longitude, and the 3rd degree of north, and the 7th of south latitude. It is, or has been, found wild in the proper Moluccas, in Gilolo, Ceram, Amboyna, Boeroe, Damma, the North and south sides of the western peninsula of New Guinea, and in all its adjacent islands. It certainly does not exist in its wild state in any of the islands west of these, nor in any of the Philippines. Wherever the soil and climate are suitable for its growth the aromatic nutmeg is raised with great facility. It is even transported to remote parts, and the seed is disseminated by birds that feed on the mace dropping the nut. These birds consist of two species of pigeon, Colomba perspicillata and ænea, which prey on the nutmeg as our own wood-pigeons on the acorn.

In its native country the nutmeg tree comes into full bearing in its ninth year, and lives to seventy-five. In shape and size, the ripe fruit resembles a peach, or rather a nectarine. When ripe, the fleshy outer substance bursts, the nutmeg in its black shining shell is seen through the interstices of its reticulated crimson envelope, the mace, which last amounts to about one-fifth part of the weight of the whole dried fruit. These two articles, the nut and mace, constitute the spices which for so many ages have been in request among the nations of Europe and Asia, although never used as a condiment by the inhabitants of the countries that produce it. The English, after the unsuccessful efforts of two centuries, succeeded at length in participating in the nutmeg trade, in consequence of having occupied the Spice Islands in 1796. In 1798 the nutmeg was introduced into Bencoolen and Penang, and in 1819 into Singapore, and at these places it is now largely cultivated, but certainly under the disadvantage of growing as a not readily acclimated exotic. In countries native and congenial to it, the nutmeg is reared with great ease, requiring little care beyond shelter from the sun and weeding.—*Crawfurd Dict. p.* 305. At the Madras Exhibition of 1855, fine samples of nutmegs were sent by General Cullen from his gardens, Velley Malay near Oodagherry south of Travancore, 1800 feet above the sea. Two sorts of nutmegs were exhibited by C. S. Vernede Esq. Commercial Agent to the Cochin government; first sort, averaging 70 to the pound, and the second sort, 100 to the pound; the former are particularly fine. In some instances the nutmegs had been coated with chunam to preserve them. Wild or spurious nutmeg, was also forwarded from the Bababoodeen Hills, Mysore, and from Canara; it is much used as a substitute for the true spice, but is almost wholly devoid of aroma and of no interest.—*M. E.* The nutmeg tree has been found growing wild in Assam, lat. 27° 30" and probably it would succeed in higher latitudes in America.—*Bonynge, America, p.* 155.

Both Nutmegs and Mace, according to Tomlinson, are the produce of the same tree (*Myristica moschata*), a native of the Molucca Islands, but cultivated in Sumatra, Java, and elsewhere in the East. It is likewise cultivated in several of the West India Islands, but with less success. The fruit of the nutmeg-tree is as large as that of our peach; but when ripe the fleshy part bursts asunder into halves, showing the stone (as we should call it in the peach) which contains within it the valuable kernel or nutmeg. But this stone is itself covered with a membranous kind of network, of a bright red colour, which is the mace: in drying, this afterwards becomes orange yellow. The appearance of the rich brown shell of the nutmeg covered with the red fibres of the mace is very beautiful in the fresh fruit. These fibres being removed, the shells are dried in the sun or by a moderate fire until they split, revealing the aromatic kernel or nutmeg. Nutmeg plantations are formed in alluvial ground, or in virgin forest land in level situations. Declivities are unfavourable on account of the slight hold these trees take on the soil, and the consequent danger of their being uprooted during the heavy rains which occur in tropical countries. Their culture in Bencoolen, which represents the ordinary mode of treatment has been minutely described by Dr. Lumsdaine, in a paper originally communicated tc the Agricultural Society of Sumatra, in 1820, and recently republished in Silliman's American Journal of Science and Arts. From this account we learn that in originating a nutmeg plantation it is necessary to select ripe and sound nuts, and set them at the distanc of a foot apart in a rich soil, covering then lightly with mould. They must then be watere every other day, weeded occasionally, an shielded from a scorching sun. In from one t two months the young seedlings may be expected to appear; and when about 4 feet high, th healthiest and most luxuriant are to be remove at the commencement of the rainy season to th plantation previously cleared and prepared fo that purpose, and set at the distance of 80 fee from each other, care being taken to prote them from the heat and from violent wind The plants are set in rows, and between the the plough is employed to clear the inte mediate spaces of weeds and grasses, whic in warm climates spring up in great luxurian and choke the soil. The plants continue to r quire watering every other day in sultry weathe and in nearly all cases the soil requires to be e riched with annual supplies of manure, which a laid on during the rains, and which are ma more stimulating as the tree increases in ag After the fifth year the trees no longer require be shielded from the sun; in the seventh ye they begin to bear fruit; and from that time the fifteenth year they generally increase in fruitfulness, being then in their highest perfection. During the progressive growth of the plantation, the beds of the trees are regularly weeded, and the roots kept covered with the mould, for these have a constant tendency to seek the surface: the growth of lateral branches is alone encouraged, and all suckers or dead and unproductive branches are removed by the pruning-knife, so as to thin the trees considerably, and admit of the descent of the night-dews, which contribute much to their well-being, especially during dry and sultry weather. The conclusion of the principal harvest is the time chosen for these prunings. As the trees advance in age, the coarser vegetation and creepers are alone removed from the intervals between the trees, and the more harmless grasses are allowed to remain, giving the plantation a park-like appearance. The use of the plough is then discontinued. Nutmeg-trees are of two kinds in the same plantation, flower-bearing, and fruit-bearing. The productive plants are in the proportion of about two-thirds to the whole plantation. It is impossible to discover the difference in the sexes of the plants until the period of flowering. Between the appearance of the blossom and the ripening of the fruit, a period of 7 months generally elapses; but when once a tree has begun bearing, it continues to produce fruit all the year round, but more plentifully in some months than in others. The months of September, October, November and December, are the period of the great harvest; those of April, May, and June of the smaller harvest. In the Moluccas these trees continue prolific for 70 or 80 years; and the annual produce, taking one tree with another, amounts to about five pounds of nutmegs and a pound and a quarter of mace of each tree. When the fruit is ripe, which is indicated by the bursting open of the fleshy portion, and the appearance of the kernel, it is gathered in by means of long hooked sticks. The first step, after removing the outer integument, is cautiously to strip off the mace, and flatten it by hand in single layers placed on mats and dried for 3 or 4 days in the sun. In damp and rainy weather the heat of a charcoal fire is employed, but with care that no smoke or heat blacken the surface of the mace. In drying, the red tint of the mace changes to orange, its substance becomes horny and brittle, and its strongly aromatic odour and taste are preserved. When well cured, it is made up in tight packages in a dry situation; but is exposed to the sun about once a fortnight to preserve its dryness, and thus to keep it from insects which attack it if it becomes damp. The nuts being liberated from their macy envelope, are conveyed to the drying house and placed on a raised stage or framework, which admits the heat from a smouldering fire beneath it, to pass freely among them The heat is kept below 140° Fahr., because too great a heat dries up the kernels, while too long continued heat produces fermentation, which increases their volume so greatly as to fill up the whole cavity of the shell, and thus prevent them from rattling, which is the criterion of due preparation." The drying-house is a brick building of suitable size, and the stage is placed at an elevation of 10 feet having 3 divisions in it for the produce of different months. The nuts are turned every second or third day, that they may all partake equally of the heat, and such as have undergone the smoking process for the period of two complete months, and rattle freely in the shell, are cracked with wooden mallets, and the worm-eaten and shrivelled ones thrown out. The sound nutmegs are rubbed over with recently prepared well sifted dry lime, and packed tightly in chests, the seams of which have been made impervious to air and water. Another and a more common method is to dip them in a mixture of salt-water and lime, and then to spread them out for 4 or 5 days in the shade to dry. But the quantity of moisture imbibed during this process, appears to increase the liability to early decay and to the attacks of insects. The surest way of preserving the kernel would be to export it in the shell; this is done in sending nutmegs to China; but it does not answer in Europe, on account of the heavy allowance for shells, which is one third of the weight. The general qualities of the nutmeg and mace are the same: their agreeable aromatic odour and pungent taste are well known, the peculiar flavour of the mace, however, being quite distinct from that of the nut. They contain, according to Bonastre, fat oil 31-6 per cent., volatile oil 6-0, starch 24, gum 1·2, free acid 0-8, lignine 54. Not more than 4-5 per cent. of volatile oil is usually obtained in the distillations at Apothecaries' Hall. The fixed oil, called *nutmeg butter* or *expressed oil of nutmeg*, is prepared in Holland: the nutmegs are beaten into a paste, which is enclosed in a bag, steamed and pressed between hot plates. It is imported in oblong cakes, wrapped in flag-leaves or leaves of the banana, and weighing about three quarters of a pound. It is of an orange or reddish brown colour, and of a fragrant odour. It is liable to much adulteration, and so also is the volatile oil, with which turpentine is frequently mixed. The article called *expressed oil of mace* is obtained from the nutmeg, and should bear its name. Nutmeg butter, according to Playfair, consists of three fatty substances, two of which are soluble in alcohol, and the third almost insoluble in that fluid: the third substance has been termed *Myristine* and from this *myritic acid* is prepared. Nutmegs are sometimes passed off as fresh, after the volatile oil has been abstracted from them. Such nutmegs are very light, and when pierced with a hot needle, do not give an oily coating to it. The best nutmegs are small, but heavy, weighing on an average 90 grains each. There is a large and inferior kind of nutmeg imported, longer and heavier than the above, weighing as much as 110 grains. This is the produce of another variety, and sometimes of a distinct species of nutmeg, and is said to be more liable to produce narcotic symptoms than the true nutmeg. Nutmegs and mace are decidedly stimulant, and in small quantities wholesome. When used in abundance they produce, by increasing the circulation, narcotic effects.—*Tomlinson.* According to *Mr. Simmonds*, the Nutmeg tree *Myristica moschata*, *M. officinalis*, or *aromatica*, is of a larger growth than the clove, attaining a height of thirty feet, and has its leaves broader in proportion to their length; the upper surface of these is of a bright green, the under of a greyish color. It is a diœcious plant, having male or barren pale yellow flowers upon one tree, and female or fertile flowers upon another. The fruit is drupaceous, and opens by two valves when ripe, displaying the beautiful reticulated scarlet arillus, which constitutes mace. Within this is a hard, dark brown, and glossy shell, covering the kernel, which is the nutmeg of the shops. The kernels of *M. tomentosa* are also used as aromatics, under the name of wild or male nutmegs. Lindley describes two other species, *M. fatua*, a native of Surinam, with greenish white flowers, and *M. sebifera* or *Virola sebifera*, a native of Guiana, with yellowish green flowers. By expression, nutmegs are made to yield a concrete oil, called *Adeps Myristicæ*, or sometimes erroneously oil of mace. A volatile oil is also procured by distillation. Nutmegs and mace are used medicinally as aromatic stimulants and condiments. In large doses they have narcotic effects. The fleshy part of the fruit is used as a preserve. Dr. Oxley has given such an admirable account of the nutmeg and its cultivation, as the result of 20 years experience in Singapore, that Simmonds draws largely from his valuable paper, which is contained in the second volume of "The Journal of the Indian Archipelago," page 641. The nutmeg tree, like many of its class, has a strong tendency to become monœcious, and planters in general are well pleased at this habit, thinking they secure a double advantage by having the male and female flowers on the same plant. This is, however, delusive, and being against the order of nature, the produce of such trees is invariably inferior, showing itself in the production of double nuts and other deformities. It is best, therefore, to have only female trees, with a due proportion of males. The female flowers, which are merely composed of a tripid calyx and no corolla, when produced by a tree in full vigor are perfectly urceolate, slightly tinged with green at the base, and well filled by the ovary, whereas the female flowers of weakly trees are entirely yellow, imperfectly urceolate, and approach more to the staminiferous flowers of the male. The shape of the fruit varies considerably, being spherical, oblong, and egg-shaped, but the nearer they approach sphericity of figure, the more highly are they prized. There is also a great variety in the foliage of different trees, from elliptic, oblong and ovate, to almost purely lanceolate-shaped leaves. This difference seems to indicate in some measure the character of the produce; trees with large oblong leaves appearing to have the largest and most spherical fruit, and those with small lanceolate leaves being in general more prolific bearers, but of inferior quality. Whilst its congener the clove has been spread over Asia, Africa, and the West Indies, the nutmeg refuses to flourish out of the Malayan Archipelago, except as an exotic, all attempts to introduce it largely into other tropical countries having decidedly failed. The island of Ternate, which is in about the same latitude as Singapore, is said to have been the spot where it was truly indigenous, but no doubt the tree is to be found on most of the Moluccas. At present the place of its origin is unproductive of the spice, having been robbed of its rich heritage by the policy of the Dutch, who at an early period removed the plantations to the Banda isles for better surveillance, where they still remain and flourish. But although care was formerly taken to extirpate the tree on the Moluccas, the mace-feeding pigions have frustrated the machinations of man, and spread it widely through the Archipelago of islands extending from the Moluccas to New Guinea. Its circle of growth extends westward as far as Pinang, or Prince of Wales Island, where, although an exotic, it has been cultivated as a mercantile speculation with success for many years. Westward of Pinang there are no plantations, looking at the subject in a mercantile point of view. The tree is to be found, indeed, in Ceylon, and the West Coast of India, but to grow it as a speculation out of its indigenous limits, is as likely to prove successful as the cultivation of apples and pears in Bengal. In the Banda Isles, where the tree may be considered as indigenous, no further attention is paid to its cultivation than setting out the plants in parks, under the shade of large forest trees, with long horizontal branches, called "Canari" by the natives. There it attains a height of 50 feet and upwards, whereas from 20 to 30 feet may be taken as a fair average of the trees in the Straits' Settlements; but notwithstanding our pigmy proportions (adds Dr. Oxley), it does not appear, from all I could ever learn, that we are relatively behind the Banda trees, either in quantity or quality of produce, and I am strongly impressed with the idea that the island of Singapore can compete with the Banda group on perfectly even terms. Our climate is quite unexceptionable for the growth of the nutmeg, being neither exposed to droughts or high winds; and although we may lose by comparison of soils, we again gain by greater facilities of sending our products to market, by the facility of obtaining abundant supplies of manure, and any amount of free and cheap labor. A nutmeg plantation, well laid out and brought up to perfection, is one of the most pleasing and agreeable properties that can be possessed. Yielding returns, more or less daily, throughout the year, there is increasing interest, besides the usual stimulus to all agriculturists of a crop time, when his produce increases to double and quadruple the ordinary routine. Trees having arrived at fifteen years growth, there is no incertitude or fear of total failure of crop, only in relative amount of produce, and this, as will be seen, is greatly in the planter's own power to command. It is against reason to suppose that a tree in flower and fruit will not expend itself if left to unaided nature: it must be supplied with suitable stimuli to make good the waste, therefore he who wants nuts must not be sparing of manure. The first requisite for the planter is choice of location. It is true that the nutmeg tree, aided by manure, will grow in almost any soil where water does not lodge, but it makes a vast difference in the degree of success, whether, the soil be originally good, or poor and improved by art. The tree does not thrive in white or sandy soils, but prefers the deep red and friable soils formed by the decomposition of granite rocks and tinged with iron, and the deeper the tinge the better. I am therefore inclined to think, that iron in the soil is almost necessary for the full development of the plant. If under the before-mentioned soil there be a rubble of iron-stone at four or five feet from the surface (a very common formation in Singapore), forming a natural drainage, the planter has obtained all that he can desire in the ground, and needs only patience and perseverance o secure success. The form of the ground ought to be undulating, to permit the running off of all superfluous water, as there is no one hing more injurious to the plant than water odging around its roots, although, in order to hrive well, it requires an atmosphere of the most umid sort, and rain almost daily. Besides the orm of the ground, situation is highly desirable articularly as regards exposure. A spot seleced for a nutmeg plantation cannot be too well heltered, as high winds are most destructive to he tree, independently of the loss occasioned by he blowing off of fruit and flower. At present here is abundant choice of land in Singapore, he greater portion of the island being as yet ncultivated, and much answering to the above escription. The land can be purchased from overnment at the rate of from 10s. to 20s. per cre in perpetuity. I would advise the man who wishes to establish a plantation, to select the virgin forest, and of all things let him avoid deserted gambier plantations, the soil of which is completely exhausted, the Chinese taking good care never to leave a spot until they have taken all they can out of it. A cleared spot has a great attraction for the inexperienced, and it is not easy to convince a man that it is less expensive to attack the primitive forest, than to attempt to clear an old gambier plantation, overrun with lalang grass; but the cutting down and burning of large forest trees is far less expensive than the extirpation of the lalang, and as the Chinese leave all the stumps of the large trees in the ground, it is almost more difficult to remove them in this state than when you have the powerful leaver of the trunk to aid you in tearing up the roots, setting aside the paramount advantage that, in the one case you possess a fresh and fertile soil, in the other an effete and barren one. Forest land, or "jungle," as it is called in the East, can be cleared for about 25 to 30 dollars (£5 to £6) per acre, by contract, but the planter had better be careful to have every stump and root of tree removed, ere he ventures to commence planting, or the white ants, attracted by the dead wood, will crowd into the land, and having consumed the food thus prepared for them, will not be slow in attacking the young trees. Whilst the planter is thus clearing the ground, he may advantageously at the same time be establishing nurseries; for these the ground ought to be well trenched and mixed with a small quantity of thoroughly decomposed manure and burned earth, making up the earth afterwards into beds of about three feet wide, with paths between them for the convenience of weeding and cleaning the young plants. Of course if the planter can obtain really good plants, the produce of well-selected seed, it will be a great saving of time and expense to him, but unless the seed be carefully chosen, I would prefer beginning my own nurseries, and in the selection of seed would recommend the most perfectly ripe and spherical nuts. Oval long nuts are to be rejected, particularly any of a pale color at one end. The planter having selected his seed, which ought to be put in the ground within twenty-four hours after being gathered, setting it about two inches deep in the beds already prepared, and at the distance of twelve to eighteen inches apart, the whole nursary to be well shaded both on top and sides, the earth kept moist and clear of weeds, and well smoked by burning wet grass or weeds in it once a week, to drive away a very small moth-like insect that is apt to infest young plants, laying its eggs on the leaf, when they become covered with yellow spots, and perish if not attended to speedily. Washing the leaves with a decoction of the Tuba root is the best remedy I know of, but where only a few plants are affected, if the spots be numerous, I would prefer to pluck up the plant altogether, rather than run the risk of the insect becoming more numerous, to the total destruction of the nursery. The nuts germinate in from a month to six weeks, and even later, and for many months after germination the seed is attached to the young plant, and many be removed apparently as sound as when planted, to the astonishment of the unlearned, who are not aware of the great disproportion in size between the ovule and albumen, the former of which is alone necessary to form the plant. The plant may be kept in nursery with advantage for nearly two years. Should they grow rapidly, and the interspaces become too small for them, every second plant had better be removed to a fresh nursery, and set out at a distance of a couple of feet from each other. When transplanted, either in this way or for their ultimate position in the plantation, care should be taken to remove them with a good ball of earth, secured by the skin of the plantain, which prevents the ball of earth falling to pieces. The nurseries being established, the ground cleared and ready, the next proceeding is to lay out and dig holes about 26 or 30 feet apart, and as the quincunx order has so many advantages, it is the form I would recommend for adoption. The holes should be at least six feet in diameter, and about four feet deep, and when refilled the surface soil is to be used, and not that which is taken out of the hole. Each hole should be filled up about one foot higher than the surrounding ground, to allow for the setting of the soil and the sinking of the tree, which, planted at this height, will in a few years be found below the level. Over each hole thus filled up, a shed, made of Attap leaves or other shelter, closed on two sides, east and west, and proportioned to the size of the plant, is to be erected. It is not a bad plan to leave an open space in the centre of the top of each shed, about twelve inches wide, by which the young plant can obtain the benefit of the dew and gentle rains, which more than compensates for the few rays of sun that can only fall upon it whilst that body is vertical. After the sheds have been completed, each hole should have added to it a couple of baskets of well decomposed manure, and an equal quantity of burned earth, when all is ready for the reception of the plant, which, having been set out, if the weather be dry will require watering for ten days or a fortnight after, in fact until it takes the soil. The planter having set out all his trees must not deem his labors completed, they are only commencing. To arrive thus far is simple and easy, but to patiently watch and tend the trees for ten years after, requires all the enthusiasm already mentioned. About three months after planting out, the young trees will receive great benefit if a small quantity of liquid fish manure be given them. In the first six years they ought to be trenched round three times, enlarging the circle each time, the trenches being dug close to the extremities of the roots, which generally correspond to the ends of the branches, and each new trench commencing where the old one terminated. They must of course greatly increase in size as the circle extends, requiring a proportionate quantity of manure, but the depth ought never to be less than two feet. The object of trenching is to loosen the soil and permit the roots to spread, otherwise the tree spindles instead of becoming broad and umbrageous. Manure is beyond all other considerations the most important to the welfare of the estate; it is that which gives quantity and quality of produce, and without it a plantation cannot be carried on. The want of it must limit the cultivation in the Straits' Settlements, and will arrest many a planter, who, having got his plantation to look well up to the eighth year with very little manure, thinks h can go on in the same manner. The nutmeg tree likes well all sorts of manures, but tha which is best suited for it seems to be well-rotted stable and cow-yard manure, mixed with vegetable matter, and when the tree is in bearin the outer covering of the nut itself, is about on of the very best things to be thrown into th dung-pit. Dead animals buried not too near th roots, also blood, fish, and oil cakes are beneficial. Guano is of no use. But although manuring is the chief element in successful cultivatio there are many other matters for the planter t attend to during the period that the trees ar growing. All obnoxious grasses must be carefully kept out of the plantation, at least from between the trees, and the harmless grasses rath encouraged, as they keep the surface cool. Th trunk of the tree ought to be carefully washe with soap and water once a year to keep it cle of moss; this has been ridiculed as a work supererogation, but let those who think so om the operation. Parasitical plants of the genu Loranthus are very apt to attach themselves the branches, and if not removed do great inju The insect enemies of the tree are not very n merous, but it has a few, white ants among t number. They seldom attack a vigorous plan it is upon the first symptoms of weakness decay that they commence their operatio Their nests may be dislodged from the ro of the plant by a dose of solution of dung, to which they have a great aversi There are several species of insects which their eggs on the leaves, and unless carefu watched and removed, they commit great hav amongst the trees. For this purpose it necessary to wash the leaves with a decoct of Tuba root, and syringe them by means c bamboo with lime and water, of the consiste of whitewash; this adheres to the leaves, will remain even after several heavy show Another nuisance is the nest of the large, ant; these collect and glue the leaves together, forming a cavity for the deposition of their *larvæ*. The best mode of destroying them is to hang a portion of some animal substance, such as the entrails of a fowl, fish, &c. to the end of a pole thrust through and protruding from the branches; the ants will run along the pole and collect in immense quantities around the bait, when, by a lighted faggot, they can be burned by thousands. This repeated once or twice a day for a week or so, will soon rid the tree of the invaders. The number of men to be kept on an estate to preserve it in first-rate order after it has come into bearing, must depend of course upon the size of the plantation, but in general one man for every one hundred trees will be found sufficient, provided there be some four or five thousand trees. On a small scale the proportion must be greater. The nutmeg planter is under the necessity of keeping up nurseries throughout the whole of his operations for the replacement of bad plants and redundant males. Of the latter ten per cent. seems to be about the best proportion to keep, but I would have completely diœcious trees. No person can boast to get a plantation completely filled up and in perfect order much sooner than fifteen years. Of the first batch planted, not more than one half will turn out perfect females, for I do not take into account monœcious trees, which I have already condemned. The tree shows flower about the seventh year, but the longer it is before doing so, the better and stronger will it be. I cannot refrain from a smile when a sanguine planter informs me with exultation that he has obtained a nut from a tree only three or four years planted out; so much the worse for his chance of success, too great precocity being incompatible with strength and longevity. The best trees do not show flower before the ninth year, and one such is worth a score of the others. This will be evident when it is stated that I have seen several rees yield more than 10,000 nuts each in one year, whereas I do not believe that there is a plantation in the Straits that averages 1,000 rom every tree. This very great disparity of bearing shows plainly that the cultivation of the plant is not yet throughly understood, or greater uniformity would prevail, and I think it clearly nough points out that a higher degree of cultivation would meet its reward. The tree has not een introduced into the Straits' sufficiently long o determine its longevity, but those introduced nd planted in the beginning of the present cenury, as yet show no symptoms of decay. *The xperiment of grafting the trees*, which at first iew presents so many advantages, both in ecuring the finest quality of nut and the cerainty of the sex, has still to be tried in this ultivation. Some three years ago (continues Dr. Oxley), I succeeded in grafting several plants by approach; these are not sufficiently old for me to decide whether it be desirable or not, for although the plants are looking well and growing, they as yet have thrown out their branches in a straggling irregular manner, having no leaders, and consequently they cannot extend their branches in the regular verticles necessary for the perfect formation of the tree without which they must ever be small and stunted, and consequently incapable of yielding any quantity of produce. The grafts have succeeded so far as stock and scion becoming one, and in time a perpendicular shoot from the wood may appear. If after that it should increase in size and strength, so as to form a tree of full dimensions, the advantage gained would be worth any trouble, the quality of some nuts being so far above that of others it would make a difference beyond present calculation; in short 1,000 such picked trees at the present prices would yield something equivalent to £4,000 a year, for £4 per tree would be a low estimate for such plants. If this ever does occur, it will change the aspect of cultivation altogether, and I see no good reason why it should not, except that those possessing trees of the quality alluded to, would not very willingly permit others to graft from them, so it is only the already successful planter who can try the experiment properly. An acre of land contains on an average 92 trees, and it is calculated an outlay of 300 dollars is required upon every acre to bring the tree to maturity; but as not more than one-half of the trees generally turn out females, and as many others are destroyed by accident and diseases to which this plant is very liable, it makes the cost of each tree, by the time it yields fruit, about eight dollars. The nutmeg tree begins to bear when about eight years old, but it gives no return for several years longer; and therefore to the expense of cultivation must be added the interest of the capital sunk. The plant being indigenous in the Moluccas, the expense of cultivation there is greatly less, and this consequently forms a strong ground of claim to the British planter for protective duties to their spices from the British Government. The planter having his tree arrived at the agreeable point of producing, has but slight trouble in preparing his produce for market. As the fruit is brought in by the gatherers, the mace is carefully removed, pressed together and flattened on a board, exposed to the sun for three or four days, it is then dry enough to be put by in the spice-house until required for exportation, when it is to be screwed into boxes, and becomes the mace of commerce. The average proportion of mace yielded in Singapore is one pound for every 433 nuts. The nutmeg itself requires more care in its curing, it being necessary to have it well and carefully dried ere the outer black shell be broken. For this purpose the usual practice is to subject it for a couple of months to the smoke of slow fires kept up underneath, whilst the nuts are spread on a grating about eight or ten feet above. The model of a perfect drying-house is easily to be obtained. Care should be taken not to dry the nuts by too great a heat, as they shrivel and lose their full and marketable appearance. It is therefore desirable to keep the nuts, when first collected, for eight or ten days out of the drying-house, exposing them at first for an hour or so to the morning sun, and increasing the exposure daily until they shake in the shell. The nuts ought never to be cracked until required for exportation, or they will be attacked and destroyed by a small weasel-like insect, the larvæ of which is deposited in the ovule, and, becoming the perfect insect, eats its way out, leaving the nut bored through and through, and worthless as a marketable commodity. Liming the nuts prevents this to a certain extent, but limed nuts are not those best liked in the English market, whereas they are preferred in that condition in the United States. When the nuts are to be limed, it is simply necessary to have them well rubbed over between the hands with powdered lime. By the Dutch mode of preparation, they are steeped in a mixture of lime and water for several weeks. This no doubt will preserve them, but it must also have a prejudicial effect on the flavor of the spice. After the nuts are thoroughly dried, which requires from six weeks to two months smoking, they cannot be too soon sent to market. But it is otherwise with the mace; that commodity, when fresh, not being in esteem in the London market, seeing that they desire it of a golden color, which it only assumes after a few months, whereas, at first when fresh it is blood red, now red blades are looked upon with suspicion, and are highly injurious to the sale of the article. This is one of those peculiar prejudices of the Englishman which somewhat impugns his wisdom; but it must be attended to, as he is very ready to pay for his caprice; therefore those who provide for him have no right to complain, although they may smile. The nutmeg tree was sent from Bencoolen to Singapore, the latter end of 1819, so that thirty-four years have elapsed since its first introduction. Sir Stamford Raffles shipped to the care of the resident commandant, Major Farquhar, 100 nutmeg plants, 25 larger ditto, and 1,000 nutmeg seeds, which were committed to the charge of Mr. Brooks, a European gardener, who was specially engaged by the East India Company to look after their embryo spice plantations here. Some of these plants were set out in rather a bad soil and locality, but several of them are at present, and have been for the last ten years, fine fruitful trees. 315 of the trees in the Government garden yielded, in 1848, 190,426 nuts, or at the average of 604 for each tree; but of these not over 50 were of the old stock, most having been planted since 1836; so that a planter may safely calculate on having a better average than is here set forth, provided he attends to his cultivation, and his trees are brought up to the age of fifteen years. If a plantation be attended to from the commencement after the manner I have endeavoured to explain, and the trees be in a good locality, the planter will undoubtedly obtain an average of 10 lbs. of spice from each tree from the fifteenth year; this, at an average price of 2s. 6d. per lb., is 25s. per annum. He can have about seventy such trees in an acre, so that there is scarcely any better or more remunerative cultivation when once established. But the race is a long one, the chances of life, and a high rate of interest in the country, make it one of no ordinary risk, and it is one that holds out no prospect of any return in less than ten years. A person commencing and stopping short of the bearing point, either by death or want of funds, will suffer almost total loss, for the value of such a property brought into a market where there are no buyers must be purely nominal. Again, if the property has arrived at the paying point, almost any person of common honesty can take charge of and carry it on, for the trees after twelve years are remarkably hardy, and bear a deal of ill treatment and neglect; not that I would recommend any person to try the experiment. But it is some consolation for the proprietor to know that stupidity will not ruin him, and that even at the distance of thousands of miles he can give such directions, as if attended to, will keep his estate in a flourishing and fruitful state. The total number of nutmeg trees in Singapore in 1848 was 55,925, of which 14,914 only were in bearing. The produce of that year was 4,085,361 nutmegs, or 23,600 lbs. in weight. The greate number of the trees, it will be perceived, have not come into full bearing, but the produce is increasing rapidly, and in 1849 it amounted to fully 66,670 lbs. Among the principal grower in that island are Dr. Oxley, Mr. C. R. Prinsep and Mr. W. Montgomerie, who have each larg plantations, with from 2,000 to 5,000 bearing trees on them. Others, as Sir J. d'Almeida, Mr Nicol, and one or two more, have planted exten-sively, but have not yet got their trees to th bearing point. A large supply of nutmeg an clove plants arrived at Pinang in 1802, from th Molucca Islands. There were 71,266 nutmeg and 55,264 clove plants; allowing one half o the former to have been male trees, there woul only have been 35,633 useful nutmeg plant It is believed that a mere fraction of these eve reached maturity, but they served to introduc the cultivation permanently. Plants were like wise sent to Ceylon and Cape Comorin. It doe not appear that the climates of these two local ties suit the nutmeg tree, as it requires rain, o at least a very damp climate throughout th year. The East India Company's spice plantations in Pinang were sold in 1824, and the trees were dispersed over the island. The spice cultivators of the Straits' Settlements have for sometime sought a further protective duty on nutmegs, and the extension of a similar protection to mace and cloves, the produce of these settlements; for singularly enough the present tariff affords no protection to mace, the growth of British possessions. From tabular statements, furnished by the Chamber of Commerce of Pinang, drawn up apparently with great care, it appears that in 1843 there were 3,046 acres cultivated with spice trees in Pinang and Province Wellesley, containing 233,995 nutmeg, and 80,418 clove trees, besides 77,671 trees in nurseries ready to be planted out; and by a similar statement from Singapore, which is however not so complete, that 743 acres are cultivated, con- aining 48,544 nutmeg trees. The island of inang is estimated to contain 160 square miles, nearly the whole of which, with the exception perhaps of summits of the hills, is well adapted o spice growing. Province Wellesley is of much greater extent, and the soil of it has al- eady ben proved to be equally well fitted for hat kind of cultivation; and the settlements of Malacca and Singapore are said to be admirably suited, in many places, for that - species f produce, the latter of which has already everal plantations fast approaching to maturity. The cultivation is capable of great extension; ncouragement is only required to be held out, nd new plantations will be rapidly formed in hese settlements. The same tables show that he produce in 1842 was, in Pinang and Pro- ince Wellesley, 18,560,281 nutmegs, 42,866 lbs. f mace, and 11,813 lb. cloves; Although this as the amount of produce for 1842, it must be emarked that crop was a complete failure, nd the average crop for some years past has een 46,666 pounds, and in Singapore, 842,328 utmegs, and 1,962 lbs. of mace. Thus making he produce from the two settlements 19,408,608 utmegs in number (or in weight 147,034 lbs.), 4,822 lbs. of mace, and 11,813 lbs. of cloves. ow the consumption of these spices in Great ritain was, on an average of four years ending 841, as follows:—Nutmegs, 121,000 lbs.; ace, 18,000 lbs.; cloves, 92,000 lbs. Showing, erefore, that the Straits' Settlements already oduce more than sufficient of the two former supply the home market. In the course of ur or five years more, Pinang alone will more an double the present quantity of nutmegs and ace produced in the Straits, and the produce of oves will be more than tripled. Simmonds has en able, from several elaborate papers in his Colonial Magazine," to condense details, showing e progress of spice plantations in Prince of Wales land and Province Wellesley. In the close of 843 there were 64,902 nutmeg trees in bearing in the Island; 39,209 male trees, 103.982 not bearing; making a total of 208,093 trees planted out, besides 52,510 plants in nursery. The quantity of ground under cultivation was 2,282 orlongs. The produce in 1842 was 15,116,591 good nuts, 1,461,226 inferior nuts, and 38,260 lbs. of mace. The gross value of the produce in 1843, reckoning the good nuts at five dollars per thousand, and the inferior at one dollar, was 76,944 dollars. The estimated number of nuts in 1843 was 12,458,762; in 1844, 25,429,000. In Province Wellesley there were 247 orlongs under cultivation with the nutmeg, on which were 10-500 bearing trees, 8,0(5 male trees, and 7,307 not yet bearing, making in all 25,902 trees planted out. The produce was in 1842, 1,969,619 good nuts, 18,842 inferior ditto, and 4,500 lbs. of mace. The value of the produce of nutmegs was 9867 dollars. The estimated number of nuts in 1843 was 1,980,000; in 1844, 2,958,000. They were in all 423 nutmeg plantations on the island and main land. There were annually exported in the four years ending 1850, 48,000 lbs. of nutmegs from Pinang, and 57,400 lbs. of mace. The French at an early period cultivated the nutmeg at the Mauritius, and from thence they carried it to Cayenne. In Sumatra it appears to have been grown successfully, and according to Sir S. Raffles, there was in 1819 a plantation at Bencoolen of 100,000 nutmeg trees, one-fourth of which were bearing. Attempts have been made in Trinidad and St. Vincent to carry out the culture, but for want of enterprise very little progress seems to have been made in the matter. Under the duties which came into operation in 1854, nutmegs, instead of standing at 1s. per pound all round, have been classified, and the so called "wild" nutmegs of the Dutch islands are to pay only 5d per pound. This deprives the Straits' produce of its last protection against that of the Banda plantations, where the tree grows spontaneously, while it gives the long Dutch nut a high protection. If an alteration in this suicidal measure is not speedily obtained, the Straits' planters will be ruined. The Dutch have the power of inundating the market with the long aromatic nut. If the original plan of putting all British and all foreign nutmegs on the same footing had been adhered to, the Straits' planters would not have complained, as they would have trusted to their superior skill and care to compensate for the grand advantage the Dutch have in their rich soils. On observing this alteration of duty, Mr. Crawfurd and Mr. Gilman immediately prepared the following memorandum for the Chancellor of the Exchequer, which however failed to influence that minister:—

Memorandum on the Duties of Nutmegs.— "The duty proposed to be levied on nutmegs is 1s. per pound for cultivated, and 5d. per pound for those commonly called wild. The ground on which this distinction is founded, is said to be that the market value of the one is but half that of the other, and that the Customs can readily distinguish between them. Now it is admitted, on all sides, that there is but one species of culinary nutmeg, the *Myristica Moschata* of botanists, although at least a score of the same genus, all unfit for human food. The parent country of the aromatic nutmegs extends from the Molucca Islands to New Guinea, inclusive. In this they grow with facility, and even in the Banda Islands, where there are parks of them, they hardly undergo any cultivation, and may truly be said, even there to be a wild product. It is only when grown as exotics, as in the British settlements of Pinang and Singapore, that they require cultivation, and that a more careful and expensive one than any other produce of the soil. Aromatic nutmegs are sometimes large and sometimes small—sometimes round, sometimes oblong, and sometimes long, and this will be found the case whether cultivated or uncultivated. How, then, the Customs are able to distinguish them it is difficult to understand. In the ordinary Prices Current no mention whatever is made of the wild and cultivated, the lowest quality being quoted in the most recent at 2s. per pound, and the highest at 3s. 10d.,—the best of what are called wild fetching a higher price than the lower qualities of what are called cultivated. But suppose the distinction could be made with the most perfect certainty, to make it would be a palpable departure from the principle adopted with every other commodity, of charging a uniform rate of duty on quality. To give an example, the present price of black pepper is 3⅝d. to 4d. per pound, while that of white pepper is 8½d to 1s. 2d. per pound, both paying the same duty of 6d.; yet nothing can be more easily distinguished than these two commodities, which, except as to curing, are the same article. Tea is a still more striking example. The duty is the same on all qualities, though prices range from 11½d. to 3s. 6d. per pound. It was the very circumstance of the difficulty of distinguishing between the different kinds of tea, especially between Bohea and Congou, which, after an eighteen months trial, overthrew the system of rated duties of 1s. 6d., 2s., and 3s., adopted on the abolition of the East India Company's monopoly in 1833. Unless the duty on nutmegs is equalised there will be no end of trouble and disputes, and however expert the Customs may be, they will certainly be outwitted, and long-shaped and small nutmegs, although really cultivated, will be introduced at the lower duty, by unscrupulous traders, as wild ones. It may be added that duties of 12d. and 5d. do not, even if a departure from the principle of charging on quality were justifiable, represent the just proportional rates which ought to be levied upon what are supposed to be, respectively, cultivated and wild, as they are represented in the ordinary Price Current by the highest and lowest prices, which are 3s. 10d. and 2s. The just proportional duty ought to be on the lowest, not 5d., but 7d. The duty, as first proposed by the Chancellor of the Exchequer, of 1s. per pound on nutmegs, without distinction, was perfectly satisfactory to the planters, merchants, and the trade in general. It is a mistake to suppose that a duty of 1s. would exclude the so-called wild nutmegs. They would be imported in large quantities, as the cost is low. In quantity it was 17 Spanish dollars per picul, and there is no reason to suppose it would be more now. The finest picked cost say 34 Spanish dollars. In Pinang and Singapore, for cultivated the price is 65 to 70 dollars. The planters for the most part do not sell on the spot, but consign here for sale on their own account. London, May 23d, 1853.

NUTMEGS IMPORTED AND EXPORTED TO AND FROM SINGAPORE.

	Imported piculs.	Exported piculs.	Growth of Singapore.	Value of the native growth.
				£
1841	227½	412	184½	3,323
1842	258	809	551	9,897
1843	150½	249	98½	1 760
1844	52	282	230	4,131
1845	41	383	342	6.143
1846	79	331	252	4,526
1847	139	416	277	4,275

NUTMEGS EXPORTED FROM JAVA.

	Nutmegs. piculs.	Mace. piculs.
1830	1,304	177
1835	5,022	1,606
1839	5,027	1,581
1843	2,133	486

—*Simmonds.* In the Penang papers for 1857, the *Gaztlee* gives the following statistics: The subjoined table of the exports of Nutmegs and Mace from Penang during the last ten official years shows a startling rate of increase. The exports in 1855 1856, 4624 piculs of nutmegs and 1340 o mace—exceed the total produce of the Bandas in 1855, which Dr. Oxley states at 4032 piculs of nutmeg and 1008 of mace. When the Singapore produce is brought into the account, it will appear that the British production of this spice now considerably exceeds the Dutch. The consumption in Europe and America has, we believe more than doubled during the last five years and if the preposterous duty were reduced t reasonable limits and the protection to the Dutch wild nutmeg withdrawn, we have little doubt th production and demand would go on improving in a still greater ratio, to the manifest advantage of this Settlement.—*Penang Gzette.*

Exports of Nutmegs and Mace during 10 *years.*

Official Years.	Nutmegs	Mace.	
	Piculs.	Piculs.	Total.
1846—47 ………	1519	477	1996
1847—48 ………	2077	661	2738
1848—49 ………	2178	666	2844
1849—50 ………	2086	656	2742
1850—51 ………	2564	751	3315
1851—52 ………	2625	886	3511
1852—53 ………	3020	781	3801
1853—54 ………	2768	887	3655
1854—55 ………	3294	898	4192
1855—56 ………	4624	1340	5964
Total…	26755	8003	34758

Imports into the United Kingdom.

NUTMEGS, WILD AND CULTIVATED.

	Imports. lbs.	Home consump. lbs.
1847 ……	367,936 ……	150,657
1848 ……	336,420 ……	167,143
1849 ……	224,021 ……	178,417
1850 ……	315,126 ……	167,683
1851 ……	358,320 ……	194,132
1852 ……	357,940 ……	239,113

MACE.

	Imports. lbs.	Consumption. lbs.
1841 ……	60,265 ……	18,821
1848 ……	47,572 ……	19,712
1849 ……	45,978 ……	20,605
1850 ……	77,337 ……	21,997
1851 ……	77,863 ……	21,695
1852 ……	61,697 ……	21,480

MACE EXPORTED—ACTUAL GROWTH OF SINGAPORE.

	Quantity—piculs.	Value—£
1841 ……	25½ ……	583
1842 ……	72 ……	1,616
1843 ……	40¾ ……	943
1844 ……	16½ ……	359
1845 ……	71 ……	1,616
1846 ……	8 ……	179
1847 ……	75 ……	1,661

.09 piculs of imported mace were also re-shipped in 1847. 40,000 lbs. of mace were imported into the United Kingdom from India in 848.—*Simmonds.*

(5690) NUTMEG BUTTER. MYRISTICA MOSCHATA.

adipootric Tilum, TAM.
ajikarra noona, TEL.
Japhul ka Tael, HIND.

Is obtained by expression from the nutmeg, it has an aromatic smell from the volatile oil it con-ains.—*M. E. J. R.*

(5691) NUTMEG OIL.

Jaiphul-ka-teil, HIND.

The Nutmeg contains a fixed or solid oil, and a volatile oil; both of which are used for medical purposes. Of the former there are two varieties; the English. which is the best, occurs in pieces of about ¾ lb in weight, wrapped in leaves of the banana, it has a uniform reddish colour inside; and the Dutch, imported from the Moluccas chiefly, in larger pieces, wrapped in leaves or paper, and of a lighter colour. *Waterston.—Faulkner.*

(5692) NUTMEGS, MALE.

Kayphul, GUZ. and HIND.

A native of the Moluccas, and frequently to be met with in some of the woods of Southern India. It is covered with a hard shell, provided with a pale arillus. It is one and a half to two inches long, elliptical, the parenchyme devoid of marbling. Its odour is weak, and flavour disagreeable. Its properties are analogous to that of the true Nutmeg, but the oil is so inferior in proportion, that it is but of little commercial value. It is thought that it might, however, be greatly improved by cultivation. They are procurable in most Indian bazars.—*Faulkner.*

(5693) NUTS, ACHEEN, are the betel nut, boiled, of very inferior quality, chiefly used by the lower classes in the South of India and are in no demand at Madras: sold from 35 to 50 Rs. a Candy.

(5694) NUTS, COLUMBO, are raw betel nuts: sold every where and are chiefly used by the Kayala, a class of Mahomedans.

(5695) NUX VOMICA, POISON NUT.

Faloos Mahee, Khanek-ul-kelb, ARAB.
Koochla, BENG.
Matseen, CHIN.
Kodakaddooruatta, CYNG.
Koachla, DUK.
Noix Vomique, FR.
Jercatcheree, Koochla, GUZ. HIND.
Faloos—Mahee, PERS.
Culaka, Kutaka, Veshamostibejum, SANS.
Yettie Cottay, TAM.
Mustig henza, Musadi, TEL.
Nux Vomica, Semina Seeds.
Strychnos Nux Vomica, Lin
Nux Vomica, or Koochla tree.
Pentand. Monog. Linn.

Nux Vomica was early used as a medicine by the Hindoos; it is their *Koochla* tree (Sans. Culaka, and Kataka), and being a produce of India, its properties must have been investigated long before it could be known to foreign nations. It is the *Izarakee* of Persian works on Materia Medica, but there is doubt respecting its name in Avicenna. *Khanuk-al-kulb*, dog-killer, and *Faloos mahee*, fish-scale, are other Arabic names. But under the name of *Jouz-ol-Kue* or Emetic Nut, Dr. Royle obtained the fruit of a Rubiaceous shrub. Dr. Pereira thinks that the *Nux Mechil* of Serapion is Nux Vomica; but in Persian works this name is applied to a Datura.

The plant is a moderate sized tree, with a short crooked trunk. Branches irregular, the young ones long and flexuose, with smooth dark grey bark. Wood white, close-grained, and bitter. Leaves opposite, with short petioles, oval, smooth, and shining, 3 to 5-nerved, differing in size. Flowers small, greenish-white, in terminal corymbs. Calyx 5-toothed. Corol funnel-shaped; limb 5 cleft, valvate. Stamens 5; filaments short, inserted over the bottom of the divisions of the calyx; anthers oblong, half exserted. Ovary 2-celled, with many ovules in each cell, attached to the thickened centre of the partition. Style equal to the corol in length. Stigma capitate. Berry round, smooth, about the size of an orange, covered with a smooth somewhat hard fragile shell, of a rich orange-colour when ripe, filled with a soft white gelatinous pulp, in which are immersed the seeds attached to a central placenta. Seeds peltate or shield-like, slightly hollowed on one side, convex on the other, about ¾ of an inch in diameter, and about 2 lines in thickness, thickly covered with silky ash coloured hairs attached to a fibrous testa, which envelopes the kernel composed of horny bitter albumen, of the form of the seed and of the embryo imbedded in a hollow in its circumference.—Roxb. Corom. i. t. 4.—A native of the Indian Archipelago and of the forests of the Peninsula of India, as well as of the Southern parts of the Bengal Presidency, as near Midnapore.—Esenb. and Eberm. 209. St. and Ch. 11. 52.

Lignum Colubrinum, supposed to be an antidote against the poison of venomous snakes, as well as a cure for intermittent fevers, is produced by other species, as *Strychnos ligustrina* and *S. Colubrina*. *S. Tieute* yields the *Upas tieute* and *Tjettek* of the Javanese, which is an aqueous extract of the bark. *S. toxifera* yields the *Woorali* or *Ourari* poison of Guyana. *S. pseudoquina* is employed in Brazil as a substitute for Cinchona Bark, and the seeds of *S. potatorum*, Roxb., *nirmulee* of the Hindoos, are employed by them to clear muddy water.

Strychnos Ignatia, usually considered as constituting a distinct genus, and called *Ignatia amara*, Linn. is however of most importance, as its seeds called St. Ignatius's beans, are frequently made to yield their Strychnia. They are ovate, triangular, of a reddish-gray colour, and about twenty of them contained in a pear-shaped fruit. They are produced in the Philippine islands, and have long been used in India, where they are called *Papecta*, and are mentioned in the work called Taleef Shereef. They are intensely bitter, and contain a larger quantity of Strychnia then the Nux Vomica seeds.

The wood of Nux Vomica tree is said by Dr. Christison to be often substituted for the *Lignum Colubrinum*, or Snake-wood. The Bark is unfortunately sold in many shops in Calcutta under the name of *Rohun*, and thus substituted for the febrifuge bark of the *Rohuna tree*, or *Soymida febrifuga* (Beng. Disp. pp. 247 and 437), which was made known by Dr. Roxburgh, written on by Dr. Duncan in 1794, and introduced into the E P. In this way probably it came to be introduced into England, and not being found saleable, was sent to Holland, and there sold and used as Angustura-bark (v. p. 325), supposed at one time to be the bark of Brucea ferruginea. In 1804, Dr. Ronbach of Hamburgh observed that it acted as a poison, and as several fatal cases occurred, it was in consequence prohibited being used in many Continental states. From its composition, Batka suspected that it was the bark of the Nux Vomica tree, or of some allied species. This Dr. Pereira confirmed by examining the specimens of Strychnos Nux Vomica in the East Indian Herbarium. (Med. Gaz. xix. p. 492.) Dr. Christison, as he informed Dr. Royle, came to the same result by examining specimens of Nux Vomica bark with French specimens of false Angustura Bark.

Dr. O'Shaughnessy in Calcutta, fully established the identity of false Angustura bark, and of the bark of the Nux Vomica tree in Journ. of Med. and Phys. Soc. of Calcutta, Jan. 1837; in consequence of an alkali having been obtained from what was supposed to be the bark of the *Soymida febrifuga*, but which proved to be the bark of Strychnos Nux Vomica. The whole forms a most instructive lesson on the absolute necessity of being thoroughly acquainted with the true nature of the drugs we prescribe.

Nux Vomica Bark is in flattish or slightly curved pieces, thick, hard, and compact; fracture dull and brownish; epidermis sometimes displaying a ferruginous, spongy, and friable efflorescence, at other times a yellowish-grey colour, marked with prominent greyish-white spots. Both appearances are due to alterations in the texture of the epidermis, and not to lichens, which are rare. The bark is smooth internally, its powder of a yellowish-white colour, without smell, but having an intense and permanent bitter taste. A drop of Nitrickacid on the external ferruginous part, turns it of a dark greenish colour; but if applied to a transverse section or internally, a dark-red spot is produced. Analysed by Pelletier and Caventou, it yielded Brucia. Dr. Christison states that it might be employed for obtaining Strychnia. An infusion of the Bark slightly reddens Litmus, Nitric acid produces in it a red, and Sulphate of Iron a green colour, but an infusion of galls a greyish-white precipitate.

Nux Vomica Seeds are round and flat, or rather shield-like, of a light-greyish colour, covered with a thick and tough testa, silky with fine hairs, which assist in detecting it when in powder and magnified. The seeds have little smell, but an intense and tenacious bitter taste; are so tough, that the E. C. give directions for powdering them (*v.* Extract). The powder, apt to be adulterated with substances employed to assist in pulverization, is of a yellowish-fawn colour. Water takes up some, but Proof and Rectified Spirit nearly all its active properties. Analysed by Pelletier and Caventou, the seeds were found to contain two alkalis, *Strychnia* and *Brucia* united with a peculiar acid, the *Igasuric*, called also Strychnine acid, a yellow Colouring matter, a Concrete Oil, Gum, Starch, Bassorin, and a small quantity of Wax.

Action. Uses. Cerebro-Spinant, Poisonous, producing tetanic convulsions without affecting the brain. Used as a Stimulant of the Nervous System in Paralysis, in doses of the powder gr. v.—gr. xv. or other effective preparations may be employed.—*Royle.*

(5696) NUX VOMICA OIL. STRYCHNOS NUX VOMICA.

Moo yettie cottay yennai, TAM.
Carun-jooty, CAN.

(5697) NYCTANTHES ARBOR TRISTIS. SORROWFUL NYCTANTHES. Lin.

Paghalamallie, TAM.
Keysur, DUK.
Manjapumarum, HORT. MAL.
Hursing, CAN.
Hursinghar, HIND.
Poghadamullay, TEL.
Sephalica SANS.

This is well known for the delicious though vanescent perfume of its flowers.—*O'Shaugh-essy, p.* 436. The delicate sweet smelling flow-rs of this shrub, or rather the tube of their co-ollas, called in Hindooie (Dundee), are of a fine ich yellow colour and are employed alone or in onjunction with Parasam flowers (Butea frondo-a), in preparing a beautiful bright yellow dye nuch sought after by the Mahometans for dyeing heir turbans.—*Ains. Mat. Med. page* 148. In Ajmeer, cultivated as a rare flower the blossoms re very fragrant and there the tubes of the co-olla are used, under the name of "kesru," to lye buff or orange colour. This plant is very bundant, wild at the foot of the Vindhya range, here the green tough stalks are used to make rge grain baskets of—*Gen. Med. Top. p.* 172. he tree of mourning, sometimes called night-looming flower, is as great a favorite in India s in the Southern States of America. Its deli-ate orange and white blossoms pour the most elicious fragrance on the evening air, and then ll in showers, bedewing the earth's cold bosom ith sweetness.—*Mason.*

(5698) NYMPHÆA, a genus of Plants the ype of the natural order *Nymphæaceæ*. It has calyx of 4 sepals girding the base of the torus. he petals, 16 to 28, adnate to the torus, elevat-l about the ovary and covering the same, and erefore at first sight appearing inserted into it. he stamens are numerous, disposed in many ies, and inserted in a similar way above the etals. There are upwards of 20 species of this enus described. They have all large floating leaves, with white, red, or blue flowers, which appear at the surface of the water.—*Eng. Cyc.*

(5699) NYMPHÆA, water lily. Griffith says there are two different species of water lily in the Tenasserim Province.—*Mason.*

(5700) NYMPHÆA ALBA, the common White Water-Lily, has cordate quite entire leaves; the stigmas 16-rayed, the rays ascending. This plant is a native of ditches, ponds, and lakes throughout Europe, and is abundant in Great Britain. The flowers are white, and according to Linnæus, open themselves in the morning at seven o'clock, and close them at four o'clock in the evening. This plant is very deservedly highly esteemed as the most beautiful of European plants. It is frequently accompanied with the yellow water-lily, and the two together give an exceedingly graceful appearance to the waters they occupy. The roots of the White Water-Lily contain an astringent principle, which renders them useful in dyeing. They also contain starch, and on this account swine feed on them, although other animals reject them. The whole plant was at one time regarded as medicinal, but is now seldom employed by medical men, although it has a popular reputation as a remedy in many diseases. There is a variety of this plant occasionally met with called *alba minor*, which has smaller flowers and leaves than the species.—*Eng. Cyc.* Found in tanks in India, and grown as the rest of the species.—*Riddell.*

(5701) NYMPHÆA CÆRULEA, Blue Water-Lily, has peltate nearly entire leaves without dots, glabrous on both surface, and 2-lobed at the base, the lobes free; the anther with an appendage at the apex; the stigmas 16 rayed. This plant is a native of Lower Egypt in rice-grounds and canals about Rosetta, Damietta, and Cairo. The flowers are very fragrant, and from its frequent representation in the sculptures of Egypt, it appears to have been regarded as a sacred plant by the ancient Egyptians.—*Eng. Cyc.*

(5702) NYMPHÆA CYANEA, BLUE LOTUS.

Neel Pudma Lila Phool, HIND.

The plant is common in the Ajmeer and Poshkur lake: the flowers are used medicinally; being considered astringent and refrigerant.—*Genl. Med. Top. p.* 144 and 198.

(5703) NYMPHÆA EDULIS, the Eatable Water Lily, has peltate broad oval entire leaves, with the under surface pubescent. This plant is a native of the East Indies, in wet fenny districts. Its flowers are small, and white or reddish. Like all the species, it has large pear-shaped roots, which contain an abundance of starch, and they are consequently used as articles of diet. The seeds also of a species nearly allied to this, the *N. rubra*, which has deep-red flowers, are also used as an article of diet. Its flowers also are held in superstitious veneration by the Hindoos in the districts of the East Indies in which it grows.—*Eng. Cyc.* Dr. Riddell says *Nymphæa Esculenta*, has a tuberous root, which is eaten and held in esteem by the Natives.—*Riddell.*

(5704) NYMPHÆA LOTUS. Lin.

Kakikullnvagudda. Tel.
Koee, Kumuda, Kumul, Hind.
Allie kasung, Tam.
Cahlara also Caco-utpala, Sans.

At Poshkur, Sambhur, &c.—*Genl. Med. Top. page* 198. *Ainslie p.* 248. *Nymphæa Lotus*, the Egyptian Lotus, has peltate leaves, sharply serrated; the under surface is pilose at the nerves, and pubescent between them. This plant is a native of Egypt, and grows in slow-running streams, especially in the Nile near Rosetta and Damietta and is found in rice-fields during the time they are under water. It has large white flowers, with the sepals red at the margins. The roots are large, tuberous, and eatable. The seeds dried were made into a bread by the ancient Egyptians, and the roots were employed in the same manner. This plant is regarded with superstitious veneration by the Egyptians. It resembles the Nelumbo of the Hindoos, a plant belonging to the same natural order, and called the True or East Indian Lotus. The latter has always been regarded as the emblem of fertility. Lotus is a name applied to various plants by the ancients. The Lotus of the *Lotophagi* was the *Zizyphus Lotus;* that of Homer and Dioscorides, a species of *Lotus*, or *Trifolium*. The Lotus of Hippocrates is the *Celtis Australis;* and the Italian Lotus is the *Diospyrus Lotus.*—*Eng. Cyc.* Its root, like that of the Tawmaray, (Nelumbium speciosum), can only be found, in dry weather, in the beds of the tanks. It is pleasant to the taste, and is made by the Natives into curries and other dishes.—*Ainslie, p.* 248. Dr. Buist has lately given the scientific world a highly interesting account of the breathing of the Lotus.

(5705) NYMPHÆA ODORATA, Sweet-Scented Water-Lily has cordate quite entire leaves, with the nerves and veins on the under surface very prominent; the stigmas 16-to 20-rayed; the rays erect, inflexed at the top. This plant is a native of North America, from Canada to the Carolinas; it is found in deep ditches and slow-running rivers. This plant is often confounded with the European Lily, but it is quite distinct. Its flowers are white tinged with red, very fragrant; they open in the morning, and close at noon. The root is as stringent, and much more powerful than the last species. It contains tannin and gallic acid and a decoction of the root gives a black precipitate, with sulphate of iron. The root is used by medical men in America as an astringent, and is employed by the people for making poultices.—*Eng. Cyc.*

(5706) NYMPHÆA ODORATA.

The flower.

Shengalaneer poo, Tam. | Ructaootpala Sans.

This beautiful lilac coloured flower ought to have had a place amongst the flowers: it has a most delightful smell, somewhat like the wall flower, and is sacred both to Sheva and to Vishnoo.—*Ainslie's Mat. Med. p.* 301.

(5707) NYMPHÆA PUBESCENS.

Koee Kummell, Hind.

A variety of the last, bears a white flower.—*Riddell.* *N. pubescens* has peltate, sharply-toothed leaves, orbicularly reniform, with the under surface pubescent and spotted, and the lobes roundish. It is a native of the East Indies, Malabar, Moluccas, Tranquebar, Ceylon, Java, and has been also found at Waree and Acra on the western coast of Africa. This plant is called Lotus throughout India, and is held sacred by the Hindoos. Its flowers are of a beautiful white. They expand during the day and close at night, and exhale a strong vinous odour.—*Eng. Cyc.*

(5708) NYMPHÆA PYGMIA. *Hypericum* and *Parnassia;* also a diminutive water-lily, the flower of which is no larger than a half-crown; grow on the Khasia Hills. The latter is the *Nymphæa pygmæa* of China and Siberia a remarkable fact in the geographical distribution of plants.—*Hooker, Him. Jour. Vol.* II. *p.* 312.

(5709) NYMPHÆA ROSACEA. Pink water lily.

Kumbula Rukla, Hind.

Cultivated in tanks, and also wild at Poshkur &c.—*Gen. Med. Top. p.* 198.

(5710) NYMPHÆA RUBRA.

Kummul, Hind.

Red flowering lotus. In tanks, flowers about the close of the rains—of a dark crimson colour.—*Riddell.*

(5711) NYMPHÆA STELLATA. This plant is common in ponds and tanks. The flowers are blue.—*Riddell.*

(5712) NYMPHÆACEÆ, a natural order of Aquatic Plants, with floating leaves and solitary flowers, found in all the hot and temperate parts of the world. They usually have 4 sepals and many petals, which latter gradually contract into stamens, indefinite in number, and either hypogynous or adherent to the sides of the carpels. The ovary is superior, divided internally into numerous cells, to whose sides adhere many seeds, containing an abundance of albumen and a small embryo external to it: the stigmas radiate from the apex of the ovary. The order differs from *Ranunculaceæ* in the consolidation of its carpels, from *Papaveraceæ* in the placentation not being parietal, and from *Nelumbiaceæ* in the want of a large truncated disc containing monospermous achenia. The stems of these plants are fleshy rhizomata, rooting in the mud at the bottom of the waters in which they grow; and their woody tissue is so loosely disposed among the cellular, as to have given rise to a controversy concerning the real nature of the plan on which it is arranged, most writers considering that it is exogenous while others refer it to the endogenous type. The species of this order are generally plants of great beauty, either the flowers or the leaves being of unusual size. The White Water-Lily (the *Nymphæa alba*) and the yellow (Nuphar luteum) of English rivers and ponds are among the finest specimens of floral development in northern latitudes. In other countries both their size and colour are augmented, brilliant hues of blue and crimson being added to the pure white of the northern species and the most delicious odour being emitted. In Demerara grows the Victoria regia, whose flowers have a diameter of 15 inches while the leaves are as much as 6½ feet across. In the East Indies, the Euryale ferox emulates the Victoria in the size of its leaves but its flowers are small and inconspicuous. In both these plants the farinaceous seeds are used for food. Barclay is another genus belonging to this order. The genera contain about 50 species.—*Eng. Cyc.*

O.

(5713) OADHAL, Sterculia Villosa, called *Oadal* in Assam, is native of the mountainous countries to the eastward of Bengal. Trunk straight. The bark is smooth, but fibrous bags are made of it. Its fibres are made into cords by the natives of the eastern frontier of Bengal, to bind wild elephants with. Of a coil of *Oadal* rope, Major Jenkins gave the following notice in the year 1847: "The *Oadal tree* is very common, and the rope is made most readily; the bark, or rather all the layers, can be stripped off from the bottom to the top of the tree with the greatest facility, and fine pliable ropes may be made from the inner layers of bark, whilst the outer yield coarse ropes. The rope is very strong and very lasting—wet doing it little injury." *Oadal* is a creeper in Kemaon, with fine, strong fibres.

(5714) OAK.

Baalut, Arab.
Eeg, Dan.
Eik, Dut.
Cheue, Fr.
Eiche, Ger.
Quercia, It

Quercus, Lat.
Dab, Pol
Roble Carbahlo, Port,
Dub, Rus.
Roble, Sp.
Ek, Sw.

A genus of well-known timber trees (*Quercus*,) mbracing about 150 species.—*Faulkner*. Several species are indigenous in the Tenasserim provinc-'s —*Mason*.—and on the mountains of Southern India.—*Wight*. Wallich found seven different species of oak Quercus fenestrata, turbinata, velutina, mherstiana, Tirbbæ, growing in Burmah and on he Tenasserim Coast, and all afford useful timber, hough inferior to the English oak.—*Mason*. No ak nor chesnut ascends above 9000 feet in he interior of Sikkim, where they are replaced y a species of hazel (Corylus); in the North Iimalaya, on the other hand, an oak (*Quercus emecarpifolia*, see vol. i. p. 187) is amongst the most alpine trees, and the nut is a different species, more resembling the European. On the outer Sikkim ranges oaks (Q. annulata ?) ascend to 10,000 feet, and there is no hazel.—*Hooker*, *Him. Journal. Vol.* II. *page* 140. It is not generally known that oaks are often very tropical plants; not only abounding at low elevations in the mountains, but descending in abundance to the level of the sea. Though little known in Ceylon, the Peninsula of India, tropical Africa, or South America, they abound in the hot valleys of the Eastern Himalaya, East Bengal, Malay Peninsula, and Indian islands; where perhaps more species grow than in any other part of the world. Such facts as this disturb our preconceived notions of the geographical distribution of the most familiar tribes of plants, and throw great doubt on the conclusions which fossil plants are supposed to indicate.—*Hooker*, *Him. Jour Vol.* II. *p.* 336.

(5715) OAKUM.

Oakum, Guz. & Hind.

A term applied to old hempen ropes pulled loose, and used in the caulking of sailing vessels.—*Faulkner*.

(5716) OATS, Avena. The Common Oat Tribe, *Aveneæ*.

Havre, Dan.
Haver, Dut.
Avoine, Fr.
Hafer, Ger.
Vena, Avena It.
Semina integumentis nudata, L.
Seeds, E. of Avena sativa, Linn.

Owies, Pol.
Avea, Port.
Owes. Rus.
Avena, Sp.
Farina ex seminibus, D.
Oatmeal.

The Oat (Βρῶμος of Dioscorides) was known to the Greeks. The Oat is distinguished among cereal grains by its loose panicle. Spikelets 3-2 flowered. Florets smaller than the glumes, naked at the base, alternately awned. Outer palea with lateral nerves, awned, ending in 2 points. Awn dorsal, kneed and twisted. Stamens 3. Ovary hairy at the top. Stigmas 2. Scales 2. Grain long, crested, and furrowed.—A native probably of the Persian region. Several varieties are cultivated in Europe.—Nees von E. 28. The grains of Oat when deprived of their integuments form *Groats*, when these are crushed, *Embden* and *Prepared Groats.* When the grain is kiln-dried, stripped of its husk and delicate outer skin, and then coarsely ground, it constitutes the *oatmeal* of Scotland. "The husk, with some adhering starch from the seed, is sold under the inconsistent name of *Seeds.*" Oats, according to Vogel, consist of 34 of husk and 66 per cent. of meal, and Oatmeal, in 100 parts, of 59 of Starch, 4·3 of Albuminous matter, Bitter Extractive and Sugar 8·25, Gum 2·5, with 23·95 of Lignin and moisture. Dr. Christison finds as much as 72 per cent. of Starch, and that it consists therefore of nearly five-sixths of real nutriment. *Action. Uses.* Groats and Oatmeal are nutrient and demulcent. When boiled with water (3 oz. to Aq.Oj. boiled to Oss.) Gruel is formed, which is so useful as diet for the sick. Oatmeal, when of thicker consistence, forms Porridge, and may be employed for making poultices. -*Royle.* Oats are principally in demand for horses, and the extraordinary increase of the latter has occasioned a proportional increase in the culture of this grain in Britain. They are grown more especially in the north and north-eastern counties; in the midland counties their culture is less extensive, but it is prevalent throughout most parts of Wales. Nearly twice as much oats as wheat is raised in the United Kingdom, but the proportion grown in Scotland is not so large as is supposed. The following is a fair estimate of the comparative production :—

	Acres	Produce.
England	2,500,000	12,500,000
Ireland	2.300,000	11,500,000
Scotland	1,300 000	6,500,000
Total	6.100,000	30,500,000

England imports annually about 1¾ million quarters from foreign countries and nearly three-fourths of a million quarters from Ireland. The average produce per acre throughout the kingdom is five quarters. The price within the last 10 years has ranged from 28s. 7d. per quarter (the famine year) to 17s. 6d. The oat, when considered in connection with the artificial grasses, and the nourishment and improvement it affords to live stock, may be regarded as one of the most important crops produced.' Its history is highly interesting, from the circumstance that in many portions of Europe it is formed into meal, and forms an important aliment for man; one sort, at least, has been cultivated from the days of Pliny, on account of its fitness as an article of diet for the sick. The country of its origin is somewhat uncertain, though the most common variety is said to be indigenous to the Island of Juan Fernandez. Another oat, resembling the cultivated variety, is also found growing wild in California. This plant was introduced into the North American Colonies soon after their settlement by the English. It was sown by Gosnold on the Elizabeth Island in 1602; cultivated in Newfoundland in 1622, and in Virginia, by Berkley, prior to 1648. The oat is a hardy grain, and is suited to climates too hot and too cold either for wheat or rye. Indeed, its flexibility is so great, that it is cultivated with success in Bengal as low as latitude twenty-five degrees North, but refuses to yield profitable crops as we approach the equator. It flourishes remarkably well, when due regard is paid to the selection of varieties, throughout the inhabited parts of Europe, the northern and central portions of Asia, Australia, Southern and Northern Africa, the cultivated regions of nearly all North America, and a large portion of South America. In the United States the growth of the oat is confined principally to the Middle, Western and Northern States. The varieties cultivated are the common white, the black, the grey, the imperial, the Hopetown, the Polish, the Egyptian, and the potato oat. The yield of the common varieties varies from forty to ninety bushels and upwards per acre, and weighing from twenty-five to fifty pounds to the bushel. The Egyptian oat is cultivated south of Tennessee, which after being sown in autumn, and fed off by stock in winter and spring, yields from ten to twenty bushels per acre. In the manufacture of malt and spirituous liquors oats enter but lightly, and thei consumption for this purpose does not exceec 60,000 bushels annually in the United States In 1840, Ireland exported 2,037,835 quarter of oats and oatmeal, but in 1846, on account o the dearth, the grain exports fell off completely Most of the grain grown in Ireland requires to b kiln-dried, and is, therefore, of lower value. Th oat, like rye, never has entered much into th foreign commerce, of Britain as the domestic consumption has always been nearly equal to th quantity produced. The annual average export from the United States for several years precedin 1817, were 70,000 bushels. By the census r turns of 1840, the total produce of the Unite States was 123,071,341 bushels; of 185 146,678,879 bushels. In Prussia 43 millio hectolitres of oats are annually raised. Th quantity of oats imported into the United Kingdom, has been declining within the last few yea In 1849, imported 1,267,106 quarters; 1850, 1,154,473; in 1851, 1,2 9,844; in 185 995,479. In 1844, 221,105 bushels of oats we raised in Van Diemen's Land on 13,864 acre The flour of oats ground rather coarsely, used as an article of food both in Scotland and in the north of England. It is prepared in various ways, chiefly as porridge, and baked into cakes. Although Oat-flour is obtained, in England, from the Avena Sativa, there are several distinct species of Oats. The oat grains or seeds are usually enclosed in their husks; when deprived of these, they are termed "groats; and these crushed constitute Embden groats.—*Hassell.* It is the hardiest of all cereal grains cultivated in Britain, of which there are about 40 species known to botanists.

(5717) OBBAIRIA, Hard, rather fine, generally close-grained, Ceylon wood, presenting, however, many open cells; heavy.

(5718) OCHRE. (YELLOW). SONAGAROO (RED).

Pewdee, HIND. GUZ.

An earthy mixture of alumina, silica, oxide of iron, and other substances, found in beds in various parts of England, India, on the Continent, &c. It is generally of a yellow or brown colour, but is sometimes reddened by calcination. It is prepared for use by grinding and elutriation; and is employed as an ingredient in painter's colours, in the polishing of metals and stones, and for other purposes.—*Faulkner.* Ochre sometimes contains a little calcareous matter and magnesia. The oxide of iron may occur in so large a proportion that the ochre becomes an ore of that metal. Ochre is found in beds some feet thick, generally above he oolite, and covered by sandstone and quartzose sands more or less ferruginous, and accompanied by grey plastic clays of a yellowish or reddish colour. All these substances enter into the composition of the ochres. The ochry earths are ground under edge millstones and elutriated for use: the yellow ochres may be changed into red or reddish brown by calcination, whereby he iron is raised to a higher degree of oxidation. Native red ochre is also called *red chalk* and *reddle or Bole.*

(5719) OCHRA, OR OKRO, ABELMOSCHUS ESCULENTUS. A plant of which the fruit is used as a vegetable in the West Indies, the United States, and in South America, and which s remarkable for the similarity of its name to he vegetable called Ochra by the Greeks, but which has not been ascertained by botanists. The ames by which the produce of the New World s distinguished in the works of Marcgrave nd Piso are Quingambo and Quigombo, and n the later works by that of Gombo and Gombaut or Gombeau. It is possible, therefore hat a classical name which was not otherwise ngaged may have been applied to a new vegetable, and, as has been the case in many instances, without any attempt being made to identify he plant named with that which had been escribed by classical authors. This plant is he Hibiscus esculentus of authors [Hibiscus] -*English Cyclopædia page* 60. The okra plant of the Southern States of America, as universally abounds in the Tenasserim Provinces, and all over the East, as it does in the West Indies.—*Mason.*

(5720) OCOTEA PICHURIM. Species of Ocotea extend from Sylhet to Deyra Dhoon, and ascend to 7000 feet. The fruit, Sassafras nuts or pichurim Beans would be worth examination.—*O'Shaughnessy, p.* 546.

The Massoy Bark,—is a Bark of doubtful origin. It is light, soft to the touch, in long, convex fragments, covered with an epidermis of whitish grey colour, with numerous lichens, internally reddish, tissue rather spongy, brittle, fracture irregular, thickness not surpassing two lines. Taste pungent, bitter, and peppery, odour strongly that of sassafras, with a trace of nutmeg. The Indians attribute tonic properties to this bark; it is rich in essential oil, and proceeds from a lofty and robust tree, very common in New Guinea and in Java. M. Guibourt has detected in this bark the volatile substance previously observed in the Pichurim bean. Fee adds to the preceding articles brief notices of two more species of *Ocotea,* and three of *Litsea,* but their properties are not of material importance.—*O'Shaughnessy, p.* 547.

(5721) OCTOPODA OR OCTOPODIDÆ, a family of Cephalopodous Mollusca to which the genera Octopus, Eledone, Philoxenis and Argonauta belong. It has the following characters: —Animal short, bursiform, ordinarily deprived of fins; head very distinct; 8 sessile arms generally nearly equal, and furnished with simple suckers naked or testaceous, no internal testaceous rudiment, but only two small cartilaginous pieces in some species. Professor Owen, in common with other Zoologists, divides the Octopods into two groups or families, the Testacea and the Nuda. The Testacea consist of the genera Argonauta and Bellerophon.

Argonauta Argo has been from the earliest periods an object of great interest to zoologists, in consequence of the accounts of its sailor-like habits handed down to us from the ancients—we need only refer to the statements of Aristotle, Pliny, Ælian, Oppian, and others—and in consequence of the difference of opinion entertained with regard to the inhabitant of the shell by naturalists; some holding that the Cephalopod found in it was a mere parasite or, even worse, a pirate that had destroyed the legitimate owner and possessed himself of the shell; and others, that the animal was the lawful possessor and original constructor of it. In 1836 Madame Jeannette Power laid before the academy at Catania her 'Osservazione Fisiche sopra il Polpo dell' Argonauta Argo,' in which, after a long and careful course of inquiry, she declared the following results:—1st, that the cephalopodous mollusc usually found therein is the constructor of the shell which it inhabits; 2nd, the clearing up of the doubts with regard to the first development of its eggs; 3rd, new facts respecting its habits. The following is this lady's description of the cephalopod of the Argonaut:—"It is furnished with eight arms, having on each two rows of suckers; the first two arms are more robust than the others, and should be so, because they serve as masts to support the sails, which, spread out, act before the wind as such. At the base they have on the inferior sides the double row of suckers, like the other six; but from the inferior row, at about an inch from the base in adults, a rather furrowed membrane begins to develop itself, which extends as far as the tip of the arm, and, holding it bent, it can no longer execute the office of a rowing arm, but is employed by the animal as a sail. These sails are so large that, when turned backwards and pressed against the shell, they can entirely cover and protect it. Thus, as far as I can conclude, the true office of these sails is exactly that of keeping themselves applied to the shell at all times, in reserve for the moment when the animal, coming to the surface of the water, removes them, and, spreading them, raises them as sails. In fact, the series of suckers of the sail-arms, when the membrane of the sails is wrapped about the shell, is placed exactly over the keel of it in such a manner that each sucker corresponds to each point in which the ribs of the shell terminate, until they reach the two margins of the spiral." Madame Power compares these sails with the two wing-like lobes of the mantle of *Cypræa* not only from the manner in which they cover the shell, but because she has reason to believe that the formation of the shell is the result of a transudation from the membrane of the sails, the corrugations of which, in secreting the calcareous matter, may be the cause of the ribbed form of the shell. Captain Philip Parker King, R. N., during his well-known voyage, met with some specimens of *Argonauta* in a rather curious way; and though he expresses his opinion with much modesty, it is plain what the inclination of that opinion was. "On our passage from Santos to St. Catherine's, in lat 28° south, we caught," says Captain King, "a Dolphin (*Coryphæna*), the maw of which I found filled with shells of *Argonauta tuberculosa*, [*A. rufa* of Owen] and all containing the *Octopus Ocythoe* that has been always found as its inhabitant. Most of the specimens were crushed by the narrow passage into the stomach, but the smaller ones were quite perfect, and had been so recently swallowed that I was enabled to preserve several of various sizes containing the animal. To some of them was attached a nidus of eggs, which was deposited between the animal and the spire. The shells varied in size from two-thirds of an inch to two and a half inches in length; each contained an *Octopus*, the bulk and shape of which were so completely adapted to that of the shell, that it seemed as if the shell increased with the animal's growth. When so many learned naturalists have differed so materially as to the character of the inhabitants of the *Argonauta*, it would be presumption in me to express an opinion; I therefore merely mention the fact, and state that in no specimen did there appear to be any connection between the animal and the shell." ('Voyages of the Adventure and Beagle,' vol. i. p. 106.) We had an opportunity of examining the specimens above alluded to soon after Captain King's return, and they bore out in every particular the description given by him. Several species are already known; and the specific characters rest in great measure upon the tuberculosities and rib-like elevations on the outside of the shell and on the breadth of the keel. The absence or presence of projecting pointed processes at the sides of the aperture near the spiral part cannot safely be relied on as a specific character: we possessed both broad-keeled and narrow-keeled specimens (now in the British Museum), in which the projecting process was present on one side of the shell and absent on the other. They are inhabitants of the seas of warm latitudes, both littoral and pelagic.

Eledone (Aristotle; Leach)—Arms provided with a single series of sessile acetabula.

E. ventricosa (*Octopus ventricosus*, Grant). Body short, round, the eight arms connected at their base by a membrane.

Octopus Lam.. Πολύπους Antiq; and Leach). —Arms provided with a double alternate series of sessile acetabula.

O. vulgaris (*Sepia octopodia* Linn.; *Sepia octopus*, Gmel. Body short and ovoid, the eight arms connected at their base by a wide membrane.—*Eng. Cyc.*

(5722) OCYMUM. a genus of Labiate Plants remarkable for the fragrance of their leaves which are used as an ingredient in savoury dishes: on which account some of the species have fror time immemorial been objects of very genera cultivation. In English gardens they are callec Basils, a corruption of Basilica, the name giver to common Basil by the monkish writers upoi plants, in allusion to its regal qualities.—*Eng Cyc.*

(5723) OCIMUM ALBUM. Linn. Whit basil; Country tea.

Cunjam koray, Tam.
Suffaid Toolsee, Duk.
Badrooge abeaz, Arab.
Kooka tolasie, Tel.
Viswa tulasi, Sans.

A shrub about a foot high. leaves have a mos pleasant aromatic taste and smell. The juice i given to children in colds to the extent of a te spoonful twice daily. The dried leaves are use as a substitute for tea.—*O'Shaughnessy, p.* 59 *Ainslie p.* 283. White Basil is chiefly grow in native gardens.—*Riddell.*

(5724) OCYMUM BASILICUM. Linn Sweet bazil.

Tirnoot patchie verie, TAM.
Subze ke beenge DUK.
Vepoodipatsa vittilooTEL
Deban shah, PERS.
Kalee tulsee, HIND.
Manjirika, SANS.

Common Basil, has many varieties, differing in their size, in the form and colour of their leaves, and in minor particulars: in their qualities they are nearly alike. This species is found wild in the hotter parts of the East Indies, where it is a perennial, with a woody root; but in English Gardens it is treated as a tender annual, being raised in the spring in a hot-bed, and turned into a warm border when the summer is so far advanced that there is no longer any danger from frost, which is instantly fatal to such plants. Besides this Mr Bentham enumerates 43 other species ('Labiatarum Genera et Species'), one of which, the *O. viride*, is used as a febrifuge in Sierra Leone. The genus is readily known by its calyx being bent downwards when the fruit is ripe, and then appearing covered as it were by a very large ovate dorsal lobe, and by the stamens being declinate.—*Eng. Cyc.* The small seeds are deemed cooling and mucilaginous, and consequently given in gonorrhœa, ardor urinæ, and affections of the kidneys.—*O'Shaughnessy*, *p.* 492. Common sweet basil is not rare, in gardens, but not met with indigenous in Tenasserim.—*Mason.*

(5725) OCYMUM GRATISSIMUM, STRONG SCENTED BASIL.

Ram Toolsi, HIND.

Cultivated near temples.—*Gen. Med. Top. page* 200.

(5726) OCYMUM HIRSUTUM.

Koolinuitan, TAM.

Whole plant slightly aromatic, prescribed by the Hindoos in decoction in the bowel complaints of teething children.—O'*Shaughnessy*, *p.* 493.

(5727) OCYMUM PILOSUM. HAIRY BASIL.

Habac, ARABIC.
Rihan and Nazboo, PERS,
Babai Babooi Toolsee, HIND.

Common in Upper India. Very common as a weed over all Rajwarra. The green leaves have a delicious smell, exactly like verbena, the seeds are exceedingly mucilagenous and sometimes used as a demulcent. The dried plant prevents bugs approaching beds &c.—*Genl. Med. Top. p.* 200. Seeds aromatic, used by women to relieve after-pains.—O'*Shaughnessy*, *page* 493.

(5728) OCYMUM SANCTUM, HOLY BASIL.

Kala Toolsi, HIND.

Cultivated near temples. *Genl. Med. Top.p.* 200.

Tolasee Root.

Tolasee vayer munnje, TAN.
Toolsi ke jur, DUK
Toolsike munkeh, DUK.
Toolasee vayr, TAM.

Tolasee is well known to be a plant sacred to Vishnoo and to be held in the highest veneration by all his followers. The root of it is made into beads and worn round the necks and arms of the Vishnoo Brahmins, and Taders. A very handsome bead is sometimes made by polishing the Betel nut called in Tamool Paak munnie.—*Ains. Mat. Med. p.* 143. The root is given in decoction in fevers, half a tea-cupful twice daily. In Hindoostanee and Bengalee the plant is called kala toolsee, in Sanscrit *Arjaka* and *Parnasa*, (Nalla tirtava, *Rheede.*) The Brahmins regard it as sacred to Vishnu, and use it in their funeral ceremonies. The Malays also strew it over the graves of their dead. —*O'Shaughnessy*, *page* 493. In the Dekhan Ocymum Sanctum is grown in almost every native garden, and is used for various purposes by Europeans, for flavouring sauces, wine or vinegar.—*Riddell.* Ocymum Sanctum or Holy Basil, is the basil tuft so often seen about the temples of Hindus, where it.

———"waves
Its fragrant blossoms o'er their graves."

It has been so generally introduced in Tenasserim that is not less common in the neighbourhood of Caren houses.—*Mason.*

(5729) OCYMUM VILLOSUM. WOOLLY BASIL.

Sufail, Toolsee, HIND.
Toolisi, TAM.

Cultivated in gardens and near temples.—*Genl. Med. Top. p.* 199. An aromatic herb, leaves used for seasonings, of easy cultivation. In all Courts of Justice, the Hindoos are sworn by these leaves, which are placed on the palm of the hand by a Bramin, who repeats the prescribed oath, and at the termination, they are masticated and swallowed. A good number of the species of this genus are used in cookery.—*Jaffrey.*

(5730) OCYPODIDÆ OR OCYPODIANS (Milne-Edwards), a tribe of Brachyurous *Crustacea*, placed by Mr. Milne-Edwards between his Pinnotherians and Gonoplacians. The Ocypodians, as their name implies, are very swift runners, living nearly always on the strand, where they dig holes for themselves. M. Milne-Edwards, who remarks that this small and very natural group is closely allied to the genera *Dolo* and *Myctoris* among the Pinnotherians, thus divides the tribe :—

Tribe of Ocypodians.	Cornea transparent, very large, ovail, occupying at least the half of the length of the ocular peduncles, and commencing very near the base of those stems.	Ocypoda.
	Cornea transparent very small, rounded, not occupying the fourth part of the length of the ocular peduncle, and only commencing close to is extremity.	Gelasimus.

Ocypoda (Fabricius). Carapace rhomboidal or even nearly square, as large behind as before. So rapid are the *Ocypodæ* in their motions that those who have observed these animals in their native haunts declare that they run so fast that a man can hardly overtake them. They hollow out holes for themselves in the sand of the sea-bank, and remain shut up in their burrows throughout the winter. They are found in warm climates of both hemispheres. M. Milne-Edwards records seven recent species.

Gelasimus—Carapace much wider than that of *Ocypoda*, more convex, and much narrower backwards. Stomachal region very small, and genital region generally very large. It inhabits the warm countries in both hemispheres. The *Gelasimi* live in holes near the edge of the sea, in pairs, and the great claw of the males is used to stop the entrance of the hole. The species are numerous.

G. Mariomis. Length about 8 lines; width about an inch, French. It is a native of Manilla.

(5731) ODAY OIL, of Cochin, is extracted from a creeper of that name and given to cattle when much worked. It sells at 8 annas a quart. It was sent to the Exhibition of 1851.

(5732) ODINA PUMATA.

Woodiah wood, Eng.
Æaythya marum, Tam. —*M. C. C.*

(5733) ODINA WOODIAR. Terebinthaceæ, Icon. 60.

Awny curry wood, Eng
Annai karai marum, Oaddy marum, Tam.
Goompana kurra. Tel.
Javula, Sans.
Jawul, Beng
Kushmulla kimul, Ajasringha, Hind

A very large tree, a native of most mountainous parts of the coast, it is also frequently found in a cultivated state, it grows readily from cuttings which appears the chief motive for employing it, for it is without leaves from the beginning of the year till May or June, and yields no shade in the months when most required. The wood of old trees is close grained of a deep reddish Mahogany colour towards the centre, the coloured part is useful for many purposes. The wood is difficult to season, but when well seasoned, the central reddish portion is useful for many purposes.—*Rhode, M. S. S.* Wight No. 5. From wounds in the bark there issues a gum which when dry is much like pieces of dry glue, but I know of no use it is put to.—*Roxb.* At Maulmain this species of Odina is quite common, and produces a valuable wood. It is called also ooday and generally supposed a very useless tree. The wood is very difficult to season, requiring to be kept, even in planks 2 or 3 years, but once well seasoned it is a close grained beautiful wood well adapted for cabinet making purposes. The gum resin which exudes from the bark, in upper India is called *Jingum* and *Kineh ke-goond.* Dr. Ainslie gives the latter as the synonyme of galbanum.—*O'Shaughnessy, page* 276. Odina Wodier bark is full of fibrous material.

(5734) ODRE, the Tamil name of a Ceylon tree which grows to fourteen inches in diameter, and ten feet in height. It is used by the native carpenters for palanquins and coach work.

(5735) ŒNOTHERA, a genus of Plants belonging to the natural order *Onagrariæ*, or *Onagraceæ.* It has a 4-cleft calyx; 4 petals; a filiform style, with a clavate or cruciform stigma; linear capsules of 4 cells, with 4 valves; and numerous seeds.—*Eng. Cyc.*

(5736) ŒNOTHERA ACAULIS. Evening Primrose. The yellow and white flowering kinds are easily cultivated by seed, in any good garden soil, and will continue during the hot weather to blossom.—*Riddell.*

(5737) ŒNOTHERA BIENNIS, Evening Primrose, has ovate-lanceolate flat toothed leaves; a rough hairy stem; petals longer than the stamens, and about half as long as the tube of the calyx; the flowers are large, numerous, and of a bright yellow-colour. It abounds on the Lancashire coast, and covers several acres of ground near Woodbridge, Suffolk. The roots are eatable, and were formerly taken after dinner to flavour wine, as olives now are; therefore the generic name was changed from *Onagra,* the Ass-Food, to *Œnothera,* the Wine-Trap. This plant was once cultivated for the sake of its tubers, which might in some measure have stood instead of the potato, had they not been superseded by the introduction of the latter. This is the only British species of the genus. There are 85 species enumerated by Don, growing chiefly in North America. They are handsome border-flowers, and deserve to be cultivated, but are not valuable on account of any properties they possess. —*Eng. Cyc.* There are between 70 and 80 species and varieties of this genus, raised from seeds, cuttings, and layers during the rains, will grow in any good garden soil, succeeds best in flower beds, requires plenty of water during the hot months.—*Jaffrey.*

(5738) ŒTHRA (Leach), a genus of Brachyurous *Crustacea,* placed by M. Milne-Edwards as the representive of his first division (Canceriens Cryptopodes) of his tribe Cancerians; and indeed his Cryptopod Cancerians are composed of this genus solely. It is found in East Indian and African Seas.

Oethra scruposa may be taken as an example. Its length is 2 to 3 inches. Colour grayish. It is found near the Island of Mauritius, and in the Indian Archipelago.—*Eng. Cyc.*

(5739) OGECERAS MAJUS.

Hulsi, Beng.

A small tree, a native of the Delta of the Ganges, and such other places as are overflowed at spring tides. Flowering time the hot season.

(5740) OIL.

Huile, Fr.
Oel, Ger.
Teil, Guz. Hind.
Olie, It.
Oleum, Lat.
Roghun, Pers.
Maslo, Rus.
[illegible] Sp.
Yennai, Tal.
Noona Tel.

This term is applied to designate a number o unctuous liquids, expressed or distilled fron certain vegetable and animal matters. The oils which form the chief exports from differen parts of India to England, France, the Mauritius &c., are Coconnut, Jingelly or Sweet Oil, Groun nut, Mustard, Rape, Sandalwood, Roosa or Gras Oil, and Fish Oil.—*Faulkner.*

Oils are generally divided into two primary groups, "Fixed" and "Volatile," the former class being again subdivided into drying, greasy, and solid oils. The value of oil as an article of commerce and its numerous uses in candle and soap-making, wool-dressing, food and medicine, as well as its importance as a lubricating agent, are well known. The following table compiled from the official reports of the Madras Custom House will show the quantity and value of all the oils exported from the Presidency.

Comparative Statement of the Gross Quantity of Oils and Oilseeds Exported from the Madras Territories to the United Kingdom, Foreign Ports and Home Ports, for the years 1847—48 *to* 1852—53.

NAMES.	1847-48.		1848-49.		1849-50.		1850-51.		1851-52.		1852-53.	
	Quantity.	Value. Rs.	Quantity.	Value Rs	Quantity.	Value. Rs	Quantity.	Value Rs.	Quantity.	Value. Rs.	Quantity.	Value. Rs.
Cocoanuts, dry...	Cwt. 74.061	2.90.393	Cwt. 1.52.042	5.60.76	Cwt. 1.32.219	5.45.876	Cwt 1.11.216	4.31 008	Cwt, 1.26.819	5,05,316	Cwt 1,51.528	5.30.928
Cocoanut oil	Gl. 5.67.801	1.26.476	Gl. 6.26 425	1.64.201	Gl. 10.97.080	2.46.335	Gl. 6.56.118	1.44 952	Gl. 9,56.937	2.11 669	Gl. 14.57.741	3.18.655
Gingeley seed	Qr. 17.518	1.60.134	Qr. 8.594	1·02.72	Cwt. 1.41.125	2.99.412	Cwt. 2.27.779	4.37.185	Cwt. 1.09.414	3.02.559	Cwt. 2.51.613	5.31.864
Gingeley oil	Gl. 19.520	14,766	Gl. 14.686	11 53	Gl. 52.721	36.294	Gl. 77.262	48.605	Gl. 46,196	26,722	Gl. 72.607	43.608
Lamp oil seeds	Qr. 1.676	13.736	Qr. 3.921	27.38	Cwt. 1 10 076	53.870	Cwt. 6.011	12.347	Cwt. 6.125	9.993	Cwt. 73 215	64 228
Lamp oil	Gl. 26.379	12.637	Gl. 17.157	9.48	Gl. 20.181	10.570	Gl. 26 093	13.386	Gl. 24.475	11.979	Gl. 51.084	20.927
Ground nuts	Cwt. 939	6.315	.....	.....	.....	.....	Cwt. 795	1.728	.....	.....	.....	.....
Ground nut oil	.....	.....	Gl. 37.204	17 43	Gl. 1.07.731	50.499	Gl 1 10.566	52 840	Gl. 31.027	14 760	Gl. 57 207	23.603
Fish oil	Gl. 3 512	2.786	.....	.....	.....	.....	Gl. 39.489	12.717	Gl. 77.240	22.157	Gl. 2.57.217	71.769
Margosa oil	Gl. 1.587	1.240	.....	.....	.....	.....	.....	.....	Gl. 1.917	1.048	Gl. 3.111	1.701
Pinnacottay oil	Gl. 3.871	2.110	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pinnacottay seeds	Cwt. 508	1.353	.....	.....	.....	.....	.....	.....	.....	.....	Cwt. 860	1.167
Cassia oil	Gl. 794	2.121	Cwt. 50	2.24	Gl. 718	2.059	Gl. 1 000	3.053	Cwt. 33	1.57	Cwt. 30	1.701
Sandal wood oil	Cwt. 59	25.619	Cwt. 61	38.99	Cwt. 93	45 015	Cwt. 141	38.215	Cwt. 93	45.75	Cwt. 96	50.057
Cotton seed	Cwt. 2,458	2.751	Cwt. 5.141	4.581	.....	.....	Cwt. 4.143	3.540	Cwt, 4.198	3.62	Cwt. 8.090	7.613
Fœnugreek	Cwt. 301	1.079	Cwt. 1.191	3.837	Cwt. 1.567	5.628	Cwt. 591	2.136	Cwt. 1.078	3.85	Cwt. 1.451	5.522
Mustard seed	Cwt. 5.828	11.009	Cwt. 6.767	14,953	Cwt. 9.435	25.559	Cwt. 9.909	22,097	Cwt. 3.636	9.31	Cwt. 16.075	34 046
Castor oil	.....	.....	.....	.....	Gl. 8.670	26.969	Gl. 15.971	25,132	Gl. 12.600	15.69	Gl. 8,059	7.818
Castor seeds	.....	.....	Cwt. 5.168	8.790	.....	.....	Cwt. 14.617	24.096	.....	.....	Cwt. 2.764	4.247
Linseed	.....	.....	Cwt. 1.256	3.897	Cwt. 401	1.539	Cwt. 801	2.271	Cwt. 1 067	2.92	Cwt. 1.106	5.275
Linseed oil	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fennel seed	.....	.....	.....	.....	.....	.....	Cwt. 122	1 097	Cwt, 191	1.712	.....	.....

In addition to the above, about 300,000 lbs. of Wax and Wax Candles, are yearly exported.

These exports are sent to the United Kingdom, America, Arabia, Persian Gulf, Cape of Good Hope, Ceylon, China, France, Maldive Islands, Mauritius, New South Wales, Pegu, West Coast of Sumatra, West Indies, Bengal, Bombay, Concan, Cutch, Goa, Guzerat, French (Indian) Ports, Scinde, Malacca and the Straits, Travancore.

Oils are substances of organic origin, and are found in both the animal and vegetable kingdoms. They are divided into Fixed and Volatile. The latter are principally products of the vegetable kingdom. The Fixed Oils are composed of carbon, hydrogen, and oxygen. Their general formula is $C_{11}. H_{10}, O$. They are liquid or solid according to the manner in which their elements are disposed. Most of them are composed of two compounds, a liquid called Olein, and a solid called Margarin, or another called Stearin. According as these solid substances abound in oils, they are liquid or solid at the ordinary temperatures of our atmosphere. Fixed Oil is found in the fat or adipose tissue of animals. Fixed Oil is found amongst plants principally in their seeds. In some cases as in the Olive [OLEA] it is yielded by the fruit. Some families of plants especially abound in oil. Thus among the *Cruciferæ* we have Mustard, Rape, and Colza seed oil, with other species cultivated in Europe, India, and Japan, of which some have of late years been imported into England. Several of the family of *Compositæ* secrete oil in qantities large enough to render it desirable to cultivate them for this purpose alone, as the sunflower and Jerusalem artichoke, also some species of *Carthamus*, or Bastard Saffron, and also the *Verbesina sativa* of India, now known to be identical with the Abyssinian *Guzotia oleifera*, and of which the oil is known in commerce by the name of hutsyelloo oil. So *Madia sativa* yields madi oil, and its seeds are said to be more abundant in oil than any plant introduced into Europe. Most of the *Cucurbitaceæ* also, as the Melon, Gourd, Cucumber, and the numerous varieties, cultivated especially in India, contain a large proportion of oil, which is expressed in the East, as it formerly was in Europe. The *Rosaceæ* also store up a large proportion of oil in the kernels of their fruit, as in the Almond, which is particularly valued ; so also that of the Apricot, as well as that of the Briancon Apricot, and other species of *Prunus*. In the Himalayas, oil is also expressed from the Apricot kernel, and has been sent to this country of a fine quality. Among the *Amentaceæ* we have also several species which yield oil of good quality, and in sufficient quantity, to repay the expense of expression, as Nut oil, obtained from the Hazel; Beech-Nut oil, from *Fagus sylvatica;* with these may be mentioned Walnut oil, from *Juglans regia*. Besides these, Poppy oil, Ben-Nut oil (*Hyperanthera*), Groundnut oil (*Arachis*), Physic-nut oil (*Jatropha*), are well known. So the cotton-seed yields oil, which is also the case with the seeds of the tea-plants, especially of the species called *Thea oleifera* and some of the Camellias. Two species of *Bassia*, *B. longifolia* and *B. latifolia*, both yield oil ; another species, *B. butyracea*, yields a vegetable butter, and is commonly known as the Ghee, or Butter-Tree of Almora. [BASSIA]. The native name of this tree is Chooncе, and Mr. Traill describes it as not being found in Kemaon, but in the adjoining Goorkha province of Dotee.—*Eng. Cyc.* Few cultivators says Simmonds are probably aware of the great importance of oil to Britain, and the number of purposes for which it is employed in the arts and manufactures. It is extensively used for candle and soap making, for burning in lamps, for diminishing friction in machinery of all kinds, and especially for locomotives, —in wool-dressing, in the manufacture of paints and varnishes, as an article of food, for medicinal purposes, &c. So important are vegetable oils deemed, that the Society of Arts, in its prize list for 1851, offered gold medals for the importation or introduction into this country of any new plants or trees from China, India, or elsewhere, producing oils or fatty substances, such as can be used as food, or are applicable to manufacturing purposes ; and also to the person who shall manufacture and import the finest specimen of oil, not less than ten gallons, the produce of olives grown in any British colony in Africa or Australasia. The time of burning of equal quantities of the following oils has been found to be—

	Hours.		Hours.
Oil of poppy.	14	Gold of pleasure (*Camelina sativa*)	9½
,, sunflower.	13	,, olives	9
,, rape	11	,, hemp seed	8
,, mustard	11½	,, tallow	10½
,, flax seed	10		

FOREIGN VEGETABLE OILS IMPORTED.

	1821.	1845.	1850.
	tuns.	tuns.	tuns.
Coco-nut oil	—	2,148	98,010
Olive oil	1 900	12 315	20,783
Palm oil	3,200	25,285	448,589 cwts.
Rape-seed oil	800	3,973	—
Linseed oil	10,500	38,634	—
	16,400	82,355	
Fish oils	32 356	22,626	21,328

The total quantity of all kinds of wool annually consumed in England and Wales, i 1843, was estimated at 801,566 packs. Now. five gallons of olive, rape-seed or other oils, being used in the preparation of every pack of wool for cloth (independent of the quantity used i soap, applicable to the woollen manufactures), i follows that five gallons in 801,566 packs ar equal to 4,007,830 gallons, or 15,904 tuns and adding for olive or sperm oil used i machinery, 1-11th of the whole, 1,446 tuns, th total quantity consumed is 17,250 tuns. -(" Enderby on the South Whale Fishery.")—*Simmonds.* Oils and fats may be liquid or solid, but the are easily fusible, and when brought in contac with paper they make a greasy mark, and render the paper translucent. The fixed oils occur both in vegetables and animals. In the former they occur chiefly in the cellular structure of the seeds, and are supposed by their oxidation or slow combustion to supply the heat necessary to germination. In animals they are deposited chiefly in the cellular membrane. The oils may be of very different consistence even in the same plant or animal; varying from a thin oil, such as almond or spermaceti oil, to solid lard or suet. The vegetable oils are usually obtained from the previously ground or bruised seed by pressure, in some cases assisted by heat. In animals the adipose cells are broken up on the application of heat by the liquefaction and expansion of the fat, which runs out or collects on the surface of the water in which it is. The constitution of fats is stated under CANDLE, to which we must refer. They are compounds of *tearic*, *margaric*, and *oleic* acids, with a base ermed *glycerine*, and the *stearate*, the *margarate* nd the *oleate* of glycerine are respectively termed *stearine*, *margarine*, and *elarine*. Fat depends for its consistence upon the proportions n which these substances occur: in the solid ats stearine or margarine prevails, and in the iquid oils elain. The ultimate analysis of fats nd oils reduces them all to carbon, hydrogen nd oxygen. Some of them yield minute porions of nitrogen, the result of adhering impuries. The following table shows the relative roportions of the three elements in 100 parts f each of the oils named:—

	Carbon	Hydrogen.	Oxygen.
Olive	77·21	13·36	9·43
Almond	77·40	11·48	10·82
Linseed	76·01	11·35	12·62
Nut	79·77	10·57	9·12
Castor	74·17	11·03	14·78
Whale	76·13	12·40	11·50
Spermaceti	78·91	10·97	10·12
Hog's lard	79·09	11·14	9·75
Suet	78·99	11·70	9·30
Butter	65·60	17·60	16·80

ats and oil are colourless or of a slight yellow nt: they may be bleached by prolonged exsure to light: they are mostly without smell taste, but the presence of certain volatile acids parts peculiar odours to some of them; thus tter contains *butyric* and other *acids*; goat's *hircic acid*; whale oil *phocenic acid*, &c. e specific gravity of fats is less than that of ter; but it varies greatly with their temperare. Thus common hog's lard at 60°, has a gr of 0·938: at 122° or in a fluid state, is 0.892; at 152° it is 0·881, and at 200° is 0·863.

	At 53°.	At 75°.	At 122°.	At 200°.
Nut oil	0·928	0·919		0·871
Almond oil	0·920			0·863
Linseed oil	0·939	0·930	0·921	0·881
Castor oil	0·970	0·957		0·908
Olive oil	0·919	0·911	0·893	0·862

The oils may be raised to a high temperature without decomposition; but at certain temperatures they deepen in colour, exhale vapour, and between 500° and 600° undergo decomposition. Hence they cannot be distilled in the ordinary way without being decomposed. The oils cannot properly be said to have any *boiling points*, for when they appear to be in a state of ebullition their glycerine is undergoing decomposition; the fatty acids are either volatilized or form new volatile products; carburetted hydrogen and carbonic acid are evolved, and carbon is left behind. During the distillation the oleic acid is partly converted into sebacic acid, and the stearic into margaric acid, while the decomposition of the glycerine produces an acrid vapour termed *acroleine*. These effects vary, however, with the nature of the oil. On passing the vapour of fats or oils slowly through a red-hot tube similar effects are produced together with a considerable quantity of hydrocarbons in a liquid, vaporous and gaseous form. Oil-gas is produced by a similar action. What is called *oil of brick* or *philosopher's oil* is prepared by soaking bricks in oil and distilling the oil from them at a red heat in an iron alembic. The recently expressed fixed oils are not much affected by the oxygen of the air: but by continued exposure to light and air, they absorb oxygen rapidly, and give out carbonic acid and hydrogen;—this action may even be so energetic as to produce ignition, especially where the oil exposes innumerable points to the oxygen: as when it is absorbed by porous substances, cotton, tow and cloths used in lubricating machinery, and then thrown into a corner in a heap. There can be no doubt that steamboats, factories, and other places have been set on fire in this way. What are called *drying oils*, such as nut-oil, poppyseed oil, linseed and some others, seem to undergo this kind of oxidation: when exposed in thin layers to the air they dry into a kind of resinous varnish, a process which is greatly accelerated by the addition of a very small quantity of oxide of lead. The *greasy oils*, on the contrary, do not dry, but become rancid by a similar exposure. The purity of the fixed oils may be determined approximatively, and the admixture of cheaper oils detected, by observing the peculiar odour of the oil when gently heated by a spirit lamp in a small porcelain or platinum capsule. The odour evolved will resemble that of the plant or animal from which it was obtained. In this way linseed oil, whale oil, train oil, or rape oil may be detected even when used to adulterate another oil. The test, however, is not always a safe one, for the odour of cold drawn oil may differ from the same oil expressed under the influence of heat. Olive oil has a different odour if grown at different places. 2. By mixing concentrated sulphuric acid with oil, (1 or 2 parts acid to 100 oil) the temperature rises and the mixture becomes coloured. If a plate of white glass be placed on a sheet of white paper, and 10 or 15 drops of oil be placed on the glass and a small drop of acid added, a colour will be produced which varies with the oil employed. With *rape oil* a greenish blue ring forms at a certain distance from the acid, while towards the centre light yellow-brown streaks may be observed. In *train oil*, from the whale or stock-fish, a peculiar motion begins at the centre and extends to the outside: a red colour appears and becomes more vivid: in 10 or 15 minutes the margin assumes a violet tinge which in 2 hours is uniform throughout. *Olive oil* instantly becomes pale yellow, and afterwards yellowish green. In *linseed oil* a beautiful dark brownish red web is formed, gradually changing into brownish black. *Tallow oil* or oleic acid becomes brown. "It seldom occurs that a better oil is used to adulterate an inferior one. Oil of almonds, olives, and codfish-oil, will, therefore, never be used for adulterating rape-oil, but probably train or perhaps linsed oil, and sometimes poppy oil. If we are led, therefore, by the odour to infer an adulteration,—for instance by train oil, which occurs the most frequently—it is only necessary to place from 10 to 15 drops of rape oil, the purity of which is undoubted, together with as much train oil, and an equal quantity of the oil whose purity is suspected, and to add to each of them a small drop of sulphuric acid. From the colour produced an inference may be drawn as to the purity of the oil, and by the difference of tinges from the vivid red of the train oil, and the bluish green of rape oil, the extent of adulteration may be detected." This plan is due to Mr. Heidenreich of Strasburg, and is quoted in full in Dr. Normandy's Commercial Hand-Book of Chemical Analysis, 1850, in which will be found a large amougt of information respecting the methods of testing the purity of oils. The purity of oils may also be tested by referring to their densities, which are said not to vary in an appreciable manner it the same oil produced in different years. In Saxony an acrometer or *oleometer* is used: it indicates the specific gravity of oils in such a way that pure rape-seed oil is indicated by 37° to 38°; hemp oil by 30° to 31°. There are various other tests: that by the capillarimeter indicates the quantity of oil which falls from a certain sized point under given circumstances. When oil of almonds or pure olive oil is shaken in a phial its surface remains even; but if mixed with oil of poppies it becomes covered with small air bubbles. When olive oil is surrounded with pounded ice it becomes completely solidified, which is not the case if adulterated with oil of poppies. Olive oil is sometimes adulterated with honey, which may be detected by shaking the oil with hot water, which dissolves the honey, and the oil separates when left at rest. The presence of the fish oil in vegetable oils may be detected by passing through them chlorine, which turns them black. The following is a list of the principal unctuous oils of commerce:—

		Sp. Gr.
1.	Linseed oil—*Linum usitatissimum et perenne.* Drying..................	0·9347
2.	Nut oil—*Corylus avellana*, and *Juglans regia.* D........................	0·9260
3.	Poppy oil—*Papaver somniferum.* D	0·9243
4.	Hemp-seed oil—*Cannabis sativa.* D.	0·9279
5.	Oil of sesamum—*Sesamum Orientale*, Greasy............................	
6.	Olive oil—*Olea Europea.* G.........	0·9176
7.	Almond oil—*Amygdalus communis*, G..	0·9180
8.	Oil of ben—*Guilandina mohringa.* G..	
9.	Cucumber oil—*Cucurbita pepo et melapepo.* D..............................	0·9231
10.	Beech oil—*Fagus sylvatica.* G...	0·922
11.	Oil of mustard—*Sinapis nigra et arvensis.* G..........................	0·916
12.	Oil of sunflower—*Helianthus annuus et perennis.* D....................	0·923
13.	Rape-seed oil—*Brassica napus et campestris.* G.......................	0·913
14.	Castor oil—*Ricinus communis.* D.	0·961
15.	Tobacco-seed oil—*Nicotiana tabacum et rustica.* D...................	0·923
16.	Plum-kernel oil—*Prunus domestica* G..	0·91
17.	Grape-seed oil—*Vitis vinifera.* D.	0·92
18.	Butter of cacao—*Theobroma cacao.* G..	0·89
19.	Coco-nut oil—*Cocos nucifera.* G...	
20.	Palm oil—*Cocos butyracea, vel Avoira elais.* G............................	0·96
21.	Laurel oil—*Laurus nobilis.* G......	

	Sp. Gr.
22. Ground nut oil—*Arachis hypogæa.* G	
23. Piney tallow—*Vateria Indica.* G.	0·926
24. Oil of Julienne—*Hesperis matronalis.* D.	0·9281
25. Oil of Camelina—*Myagrum sativa.* D.	0·9252
26. Oil of weld-seed—*Reseda luteola.* D.	0·9328
27. Oil of garden-cresses—*Lepidium sativum.* D.	0·9240
28. Oil of deadly nightshade—*Atropa belladonna.* D.	0 9250
29. Cotton-seed oil—*Gossypium Barbadense.* D.	
30. Colza oil—*Brassica campestris ; B : Oleifra* G.	0·9136
31. Summer rapeseed oil—*Brassica præcox.* G.	0·9139
32. Oil of radish-seed—*Raphanus sativus oleifera.* G.	0.9187
33. Cherry-stone oil.—*Prunus cerasus.* G.	0·9239
34. Apple-seed oil.—*Pyrus malus.* G.	
35. Spindle-tree oil.—*Euonymus Europæus.* G.	0·9380
36· Cornel-berry-tree oil—*Cornus sanguinea.* G.	
37. Oil of the roots of cyper-grass—*Cyperus esculenta.* G.	0.0180
38. Henbane-seed oil—*Hyosciamus niger.* G.	0·9130
9. Horse-chestnut oil—*Æsculus hippocastanum.* G·	0·927
0· Pine top oil.—*Pinus abies.* D.	0 928

The proportion of oil contained in seeds is oft-
n very considerable : linseed contains 20 per
ent. of oil. ; rape-seed from 35 to 40 ; castor oil
eeds as much as 60 per cent. The oil is usually
btained by means of expression. In Europe,
n oil-mill is used for the purpose ; but it is de-
rable first to pass such hard seed as lint or rape
etween iron rollers, in order to crack the shells.
hese rollers are of cast-iron, turned truly in a
the, and their spindles run in brass bushes fixed in an iron frame bolted to the frame work of the mill. These frames have mortises, in which the bushes for the rollers are placed and are adjusted by screws passing through the ends of the iron frames : this allows the rollers to be set at any distance apart, according to the size and hardness of the seed to be crushed. The rollers are sometimes of different sizes, so that different velocities may be given to their surfaces : this enables them to draw the seeds in, and to perform their work more quickly. One of the rollers has on its axis a small spur-weel, which engages a cog-wheel on the main shaft of the mill. Its motion by another pinion to the second roller. By giving to the roller pinions a dissimilar number of teeth, they may be made to revolve with different velocities, which answers the same purpose as making them of different sizes. Above the rollers is a hopper containing the seed, which runs out at an opening in the bottom into a trough or shoe, which is agitated by a piece of wood nailed to it resting on the cogwheel : the shoe thus feeds the rollers with a small quantity of seed at a time, and prevents them from being choked up. A plate of iron attached to the frame on each side presses by its edge against the lower part of the rollers, and scrapes off any adhering seed. The crushed seed falls upon an inclined board, and collects in a heap, from which it is removed to feed the running stones. The arrangement of the rollers resembles that of the crushing mill. The seed broken by the rollers is passed under two vertical mill-stones or *runners*, revolving on a horizontal bed, where it is further bruised and prepared for compression. In some places the rollers are not used, but the seed is at once subjected to the action of the runners. Hard and smooth grains are, however, liable to slip away from beneath the running stones, and thus require a much longer time to prepare them for the next process, that of compression. Rollers do their work rapidly, but they require great power to work them. When the seed is sufficiently bruised by either or both of these means, it is collected into hair bags and placed in what is called a *wedge-press*. In olive-oil mills a screw-press may be used but the hardness and smoothness of the grains of lint and rape, and the cavities formed by the broken shell which retain the oil, require the exertion of a stronger force. The hair bags containing the crushed seeds are placed between wedges of wood contained within a strong framing. The wedges are then driven down by a heavy ram or pestle worked by machinery until the pestle rebounds from them 3 times, when they are judged to be sufficiently tight. The oil thus obtained is of the *best quality*, and is kept distinct from that obtained by the after process. The seeds come out of the bags in the form of flat cakes : these are broken up, and pounded in mortars with

heavy stampers, which reduce the parenchyma of the seed to a fine meal, so that the oil can escape more freely when subjected to a second compression, which is now aided by heat. The pounded seed or meal is heated to the temperature of melting bees'-wax in a pan, and is kept in agitation by a spatula worked by machinery. The meal is again put into hair bags and compressed, and the resulting oil is considered to be the *best* of the *second* quality. Another compression produces oil of the *ordinary second quality*. During the heating of the meal a little water is sometimes added; but in Holland this practice is considered to be injurious. The cakes are still fat and soft, and are sold as food for cattle; but the Dutch break them down and stamp them again. The result is an impalpable paste, which is head with a very little water, and kept for some time at the temperature of boiling water, with diligent stirring. It is then subjected to the greatest pressure that has yet been applied, and the result is an oil of the *lowest* quality. The cake is dry and hard like a board, and is used for manure. Some of the small millers in Holland purchase oil-cakes from France and Flanders for the purpose of preparing this inferior oil. —*Tomlinson.*

Native Oil Mills.—The principal native oil mill of India, of which, however, there are some varieties, consists of a simple wooden mortar with revolving pestle. It is in common use; two oxen are harnessed to the geering, which depends from the extremity of the pestle, — a man sits on the top of the mortar, and throws in the seeds that may have got displaced. The mill grinds twice a day; a fresh man and team being employed on each occasion. When sesame oil is to be made, about seventy seers measure, or two and a half bushels of seeds are thrown in; to this ten seers, or two quarts and three-quarters of water, are gradually added; this on the continuance of the grinding, which lasts in all six hours, unites with the fibrous portion of the seeds, and forms a cake, which, when removed, leaves the oil clean and pure at the bottom of the mortar. From this it is taken out by a coco-nut shell cup, on the pestle being withdrawn. Other seed oils are described by Dr. Buchanan, as made almost entirely in the same way as from the sesamum. The exceptions are the castor oil, obtained from either the small or large varieties of *Ricinus*. This, at Seringapatam, is first parched in pots, containing something more than a seer each. It is then beaten in a mortar, and formed into balls; of these, from four to sixteen seers are put in an earthenware pot and boiled with an equal quantity of water, for the space of five hours; frequent care being taken to stir the mixture to prevent it from burning. The oil now floats on the surface, and is skimmed off pure. The oil mill made use of at Bombay, and to the northward, at Surat, Cambay, Kurrachee, &c., differs a little from that just described, in having a very strong wooden frame round the mouth of the mortar; on this the man who keeps the seeds in order sits. In Scinde a camel is employed to drive the mill instead of bullocks. Castor oil seed is thrown into the mill like other seeds, as already described; when removed it requires to be boiled for an hour, and then strained through a cloth to free it from the fragments of the seed. It is a curious fact, and illustrative of the imperfect manner in which the oil is separated from the seeds, that while the common pressman only obtained some 26¼ per cent., Boussingault, in his laboratory, from the same seeds, actually procured 41 per cent. When the oil cakes are meant for feeding stock, this loss is of little consequence, inasmuch as the oil serves a very good purpose, but when the cake is only intended to be used as a manure, it is a great loss, inasmuch as the oil is of little or no use in adding any food for crops to the soil.—*Simmonds.* The volatile oils are very numerous in the Vegetable kingdom. They are called volatile on account of the ready manner in which they may be volatilised under the influence of heat. The facility with which they are diffused in the atmosphere renders them easy of detection, and it is to this class of substances that plants owe their peculiar odours. Many of them are employed in perfumery, others are used as stimulants in medicine, and some are poisons. Their composition is much more varied than that of the fixed oils, and to the chemist they offer an exceedingly interesting field of research. Many of them have a constitution analogous to the compounds obtained by chemists from the compound radicals. They are divided by chemists into three groups:—1, those containing only carbon and hydrogen, as oil of turpentine; 2, those containing also oxygen, as oil of cloves; 3, those containing sulphur, as oil of garlic. Many natural orders are characterised by yielding volatile oils. Thus the *Lamiaceæ*, *Myrtaceæ*, and others, embrace species all of which contain volatile oil in their leaves. Many of the *Umbelliferæ* yield a volatile oil in their fruits. The petals are often the seat of these secretions and especially those most prized as the Rose, the Jasmine, the Heliotrope, and many others.—*Eng. Cyc.* Appended is a table of volatile oils employed in medical practice. They are almost al powerful stimulants and carminatives. A drop o two dissolved in a few minims of spirit, and a ounce of water added, gives an extemporaneou substitute for the distilled water of the plant, an a useful vehicle for many draughts or mixture These oils are often added in minute quantitie to pill-masses, either to give an agreeable flavou or counteract their tendency to griping.—*Beng Phar. page* 379.

TABLE OF VOLATILE OILS.

Classical and English Name of Plant.	Native names.	Part used.	Colour of Oil.	Sp. Gr.	Uses and Remarks.
Pimpinella anisum, common anise;	......	Fruits, ...	Yellow, ...	0.985	Carminative congeals at 50°.
Ilicium anisatum, star anise;	Badian kutai. ...	Do., ...	Do., ...	Do.	Ditto.
Anthemis nobilis, chamomile, ...	Baboone, ...	Flowers, ...	Deep blue, ...	......	Tonic, anthelmintic.
Lavandula vera, lavender, ...	......	Do., ...	Yellow, ...	0.877 to 0.905	Fragrant, stimulant.
Ruta graveolens, and other species, rue, ...	Sudab, ...	Do. and herb, ...	Do., ...	......	Stimulant given in amenorrhœa.
Andropogan Iwaranchusa, ...	Roosa, ...	Grass, ...	Do., ..	......	Fragrant and stimulant.
Anethum graveolens, dill, ... ——— Sowa, ... ——— Panmori, ...	Souf, ...	Fruits, ...	Do., ...	0.994	Stimulant in flatulence.
Carum carui, carraway, ... ——— Nigrum, ...	Zeera seeah, ...	Do., ...	Do., ...	......	Ditto.
Eugenia Pimento, (allspice,)	......	Do., ...	Do., ...	......	
Amomum Zingeber, (ginger,)	Ada, ...	Root, ...	Do., ...	......	Ditto.
Fœniculum officinale, (fennel,)	......	Fruits, ...	......	0.997	
Melaleuca cajeputi, (cajeput,)	Kyapooti, ...	Leaves, ...	Green, ...	0.927	
Juniperus communis, (juniper,)	Hoober, ...	Fruits, ...	Do., ...	0.878	Stimulant and diuretic.
Piper Cubeba, (Cubebs,)	Kubab chinee, ...	Do., ...	Yellow, ...	......	Ditto.
Caryophyllus aromaticus, (clove,) ...	Long, ...	Unripe flowers dried,	Do., ...	1.055	Almost caustic.
Laurus cinnamomum, (cinnamon,)	Darchinee, ...	Bark, ...	Reddish yellow, ...	......	Ditto.
Juniperus sabina, (savine,)	......	Tops, ...	Yellow, ...	......	In amenorrhœa.
Ocymum basilicum, (basil,)	Tulsi, ...	Herb, ...	Do., ...	......	
Rosmarinus officinalis, (rosemary,) ...	......	Tops, ...	Do., ...	0.934	Carminative.
Moringa pterygosperma, (sohunjuna,) ..	Sohunjuna, ...	Roots, ...	Do., ...	......	Vesicatory.
Mentha piperita, (peppermint.)	......	Herb, ...	Do., ...	0.920	Ditto, much used in cholera.
Mentha pulegium, (pennyroyal,).	......	Do..	Do., ...	......	Ditto, Stimulant.
Mentha viridis, (spearmint,)	Pudina, ...	Do., ...	Do., ...	......	Ditto.
Amomum cardamomum, (cardamom,) ...	Elachee, ...	Fruits, ...	Do., ...	......	
Origanum majorana, (marjoram,) ...	......	Herb, ...	Do., ...	......	Ditto.
Sassafras officinale.* (sassafras.)	......	Bruised root, ...	Do., or colorless, ..	1.094	Fragrant and diuretic.

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* A beautiful oil has been obtained from the Nipal sassafras.

Beng. Phar. p. 380.

Fixed oils are found in the cells and intercellular spaces of the fruit, leaves and other parts of plants. Some of these are drying oils, as linseed oil, from *Linum usitatissimum*; some are fat oils, as that from olives (fruit of *Olea sativa* or *Europæa*); whilst others are solid, as palm oil. The solid oils, butters or fats procured from plants have been described under the head, *Butter*, to which we refer, merely mentioning here that the chief are, butter of cacao, from *Theobroma cacao*; of cinnamon, from *Cinnamomum verum*; of nutmeg, from *Myristica moschata*; of coconut, from *Cocos nucifera*; of laurel, from *Laurus nobilis*; of palm oil, from *Elais guianiensis*; Shea butter, from *Bassia Parkii*; Galam butter, or Ghee, from *Bassia butyracea*; and vegetable tallow, from *Stillingia sebifera* in China, from *Vateria indica* in Canara and China, and from *Pentadesma butyracea* in Sierra Leone, and from the almond. These oils contain a large amount of stearine, and are used as substitutes for fat. Some of them are imported in large quantities, and enter into the composition of soap, candles, &c.—Castor oil, from the seeds of *Ricinus communis*, differs from other fixed oils in its composition. Decandolle states the following as the quantity of oil obtained from various seeds :—

	Per cent. in weight.
Hazel-nut, ...	60
Garden cress, ...	57
Olive, ...	50
Walnut, ...	50
Poppy (*Papaver somniferum*)	48
Almond, ...	46
Caper-spurge (*Euphorbia Lathyris*) ..	41
Colza (*Brassica oleracea*), ...	39
White mustard (*Sinapis alba*),... ...	36
Tobacco, ...	34
Plum, ...	33
Woad	30
Hemp, ...	25
Flax, ...	22
Sunflower, ...	15
Buckwheat, ...	14
Grapes, ...	12

The following table, quoted from Boussingault, shows the results of some experiments made by M. Gauzac, of Daguy :—

	Seed produced per acre.			Oil obtained per acre in lbs.		Oil per cent.	Cake per cent.
	cwts	qrs.	lbs.	lbs	ozs.		
Colewort	19	0	15	875	4	40	54
Rocket	15	1	3	320	8	18	73
Winter rape..	16	2	18	641	6	33	62
Swedish turnips........ .	15	1	26	595	8	33	62
Curled colewort	16	2	18	641	6	33	62
Turnip cabbage	13	3	19	565	4	33	61
Gold of pleasure	17	1	16	545	6	27	72
Sunflower......	15	3	14	275	0	15	80
Flax	15	1	25	365	0	22	69
White poppy.	10	1	18	560	8	46	52
Hemp	7	3	21	229	0	25	70
Summer rape...	11	3	17	412	5	30	65

Simmonds. In estimating the value of an oil producing plant or tree, the other valuable products which it yields should not be lost sight of. The linseed in addition to its oil produces the scarcely less valuable flax, hemp yields a fibre and an intoxicating resin, safflower, a dye—pinnacotay, a soft inferior gum—poonga, a valuable timber—piney, a resin—gamboge tree, a valuable pigment—mahowa, a spirit distilled from the flowers, &c., &c., whilst in the case of the poppy, the oil is second in importance to the more valuable opium. An excellent epitome of the particular qualities, on which the value of an oil as an article of commerce depends will be found in the accompanying extracts of a letter from G. F. Wilson, Esq. to Sir William Hooker, Royal gardens, Kew : "Every oil, or grease, whether solid or liquid, if not poisonous or acrid, like croton oil, viscid and gummy, like castor oil, or drying, like linseed oil, must be worth in London at least £30 a ton. Among greases solid at above 60° Fahrenheit, the higher the melting point (other things equal), the greater the value ; for example, the vegetable tallow of Borneo melting at about 90° Fahrenheit is worth at least £5 a ton more than the cocoanut oil of Ceylon melting at 70°. The effect of the soap duty having been taken off, may probably before long, materially change the relative values of greases ; but at present, liquid oils, like the ground nut (*Arachis Hypogea*) are worth more than soft solid oils, like the Bassia butter of India, as they require less manufacturing to fit them for use, the liquid oil after a simple treatment in a cheap apparatus, being fit for burning in lamps, while the soft solid oils being neither hard enough for use in candles, or liquid enough for use in lamps, require to go through a press before they are saleable, except for soap-making. Greases may have particular advantages, such as being little acted upon by the air, and therefore not easily becoming rancid, but these good qualities, can only be acertained by experiments which your correspondents had perhaps better leave to us." "We have been engaged in some experiments upon oils, for use in medicine, in which it seems probable they will take an important place; already one vegetable oil has been found to be almost as efficacious as cod liver oil, with the advantages of being less unpleasant and cheaper. On account of this new use, it might be well to collect small quantities of oils, even if they did not obey the conditions mentioned above. The value of oil must depend a little (especially when found in out of the way places) upon the way it is held in its matrix; for example. the oil of the Lumbang-nut (*Aleurites triloba*) can be separated with much less labour and simpler machinery than the cocoanut oil, which requires very great pressure to extract it from the copperah, or dried cocoanut kernel."

"Waxes are worth more than greases, on account of their very high melting points; their relative values depend upon colour, transparency, and freedom from resinous matter. Resin may be easily detected by lighting a small piece of the wax; the more smoke, the greater proportion of resin, and therefore less value; the paler and more transparent the wax the better. The most valuable tree wax known, is the beautiful insect wax of China." "A simple way to try an oil nut is to crush it with a stone, and then squeeze it between the finger and thumb; if it contains any considerable quantity of greases, enough will be pressed out to judge of colour, hardness and sweetness; if the nut tastes oily, and yet oil does not come out by this treatment, it is well to dry the kernel before squeezing; and, in the case of nuts containing greases, solid at a high temperature, like that of the *Myristica Sebifera*, it is well also to heat the nut. Where a stearic candle can be got, and is burned down a little, until it has formed a cup, and then extinguished, into this a little of the material to be tried may be placed; after a moment's burning, the candle material with which the wick is saturated is burned out, the new material to be tried, in the cup takes its place, and becomes the material supplying the wick until the cup is emptied, and so can be judged of, or a piece of string dipped in the oil or melted grease makes a very tolerable wick; or simpler still, where the nut is very full of oil if lighted at one end, it will at least show what tendency to smoke there is, and the colour of the light."

"Some of the resins ought to come in for candle making, though I believe that they have never been extensively used, except for the commonest sorts of candles, on account of their giving off so much smoke; but as some descriptions smoke ess than others, there is a hope that new ones may be found smoking still less: these would then be very serviceable in candle making. The points connected with new greases, &c., that we should be most thankful for information upon, are, the manner of growth, probable expense of ollecting, means of transport, and quantity likely o be obtained, with small specimens of the grease, if manufactured, and of the fruit, with both its husk and hard shell, where these exist."

Of vegetable substances of Southern Asia, producing "volatile oils" there is an immense variety, but with the exception of the oils of cassia and cinnamon, roosa and the rose utter, few are of any commercial importance, nor are they prepared in any quantity for consumption in India. Scented oils erroneously termed "volatile" obtained by the repeated distillation of fragrant herbs, &c., over into a receiver containing a portion of any fixed oil, to which the aroma is imparted, are prepared to some extent but chiefly for native use. Sandalwood oil and the large variety of utters, &c., which form the principal part of native perfumery are included in this class.—*M. E. J. R.* The subjoined list will serve to exhibit the richness of the produce of different seeds, of Southern Asia, from which varieties of oil are extracted; it gives the proportion of oil per cent. in weight:—

Black til, (*Verbesena sativa*), ...	46·4
Gingely oil (*Sesamum orientale*), ...	46 7
Ground nuts, *Arachis hypogæa*, ..	45·5
Pounded seeds obtained from the Ponnay-tree (*Calophyllum inophyllum*), a bitter lamp oil, ...	63·7
Karunj seeds, from the *Pongamia glabra*	26 7
Ram till, the seeds of *Guizotia oleifera*,	35
Poppy seeds (*Papaver somniferum*), ...	43 to 58
Silaam, an oil seed from Nepaul, ...	41
Rape seed (*Brassica napus*), ...	33

The foregoing are not all the seeds from which oil is extracted by the natives of Southern Asia. —*Simmonds.* The oil seeds most generally cultivated in India are the castor, gingely, rape, mustard, ground nut, ramtill, linseed, and poppy, but the latter is cultivated for its opium the seed forming a secondary consideration. The following plants grow in a wild state, their fruit being collected and the oil expressed as occasion requires; margosa, ben, brumadundoo, pinnacotty, soap-nut, kurunj, cashew-nut, poovana, piney, neradimootoo, physic-nut, cheeronjee, coorookoopilly, &c. &c. &c.—*Madras Exhibition Juries Reports.* Oil is, in Malay, *minah,* and in Javanese, *langa,* both of them words of extensive currency throughout the Malay and Philippine Archipelagos. The plants from which fatty oils are chiefly extracted are the coco-palm, the ground pea, the sesame, and the palma christi; the first for edible use, and the three last for the lamp. In the islands of the Molucca sea, a fine esculent oil is expressed from the nut of the kanari tree (Canarium commune). Crawfurd is not aware that oil is expressed in any of the islands from cruciform plants, nor is flax reared for this purpose. Animal oils are hardly used in any shape: essential oils are obtained from the clove, the nutmeg, the kayu-puti (Melaleuca cajeput) and in great abundance and cheapness from the Malay camphor-tree (Dryobalanops camphora). —*Crawfurd Dict. page* 307. One hundred and twenty fixed oils are known to be produced hroughout the Madras Presidency and Burmah. These may be arranged as follows:

Fixed Vegetable oils, including drying, greasy and solid oils,	105
Wood oils,	10
Mineral oil,	1
Animal oils,	4
Total...	120

Of the first class, Coconut, Castor, Groundnut, Gingely and its variety, Rape, Mustard and Linseed form considerable articles of foreign trade. The first three being exported in the shape of oil, the last two as oil seed, and Gingely, both as an oil and oil seed. In addition to these, the following are consumed to a large extent in India —Lamp, Ramtill, Kurunj, Pinnacotay, Illoopoo, Piney or Doopada, Margosa or Neem, Physic nut, Brunnadundoo, Safflower and Poppy. Of the remainder some are medicinal and some are prepared only in those localities, in which the substances producing them happen to abound in a wild state. The prices of these products vary very considerably, not only in different parts of the Presidency, but even in various towns of the same district. It is therefore difficult, if not altogether impracticable, to fix their respective values, with any degree of certainty; an increased demand or greater facility of transit moreover considerably affect their present value. —*M. E. J. R. Eng. Cyc.* The following list contains the names of the better known oils of Southern Asia.

Oil of sweet flag.	Acorus calamus.
Do. belgaum walnut,	Aleurites triloba.
Do. caju,	Anacardium occidentale.
Do. khus-khus, or vetiver,	Anatherum muricatum.
Do. grass, or oil of spikenard (roosa ka tel),	Andropogon calamus aromaticus.
Do of bishops weed seed,	Anethum sowa.
	Apricot Oil, Choohara and Zind Aloo ke tel.
Do. ground nut,	Arachis hypogœa.
Do prickly poppy,	Argemone mexicana.
Butter of Ghee tree,	Bassia Butyracea.
Do. mawa,	Bassia latifolia.
Do. illoopoo,	Bassia longifolia.
Do. kawan,	Bassia species.
Do. Shanghae,	Brassica chinensis.
Rape seed,	Brassica napus.
Do. pulas,	Butea frondosa.
	Cæsalpina oleosperma.
Do. poon seed,	Calophyllum inophyllum.
Oil hemp seed,	Cannabis sativa.
Do. koosum,	Carthamus tinctorius.
Do of cloves,	Caryophyllus aromaticus.
Do. of cummin,	Cuminum cyminum.
Do. malkunganee, or staff tree,	Celastrus paniculata.
Do. cheeronjee,	Chirongia sapida.
Do. of cassia	Cinnamomum species.
Do. of cinnamon,	Cinnamomum zeylanicum.
Do. of lemons,	Citrus limonum.
Do cocoanut,	Cocos nucifera.
Do. of coriander,	Coriandrum sativum.
Do. cucumber seed,	Cucurbita pepo.
Do. melon seed,	Cucumis melo.
Do. pumpkin seed,	Cucurbita maxima.
Do. purging,	Curcas purgans.
Do wood	Dipterocarpus several species
Agait or Napoota	Didynamia gymnospermum.
Do. mijo,	Dolichos soja.
	Dolichos biflorus.
Do. of cardamom	Elettaria cardamomum.
Do. Japan,	Erysimum perfoliatum.
Do. of sweet fennel,	Fœniculum dulce.
Do. gamboge butter,	Garcinia pictoria.
	Garcinea purpurea.
Do. bonduc nut,	Guilandina bonduc.
Do. ramtil,	Guizotia oleifera.
Do. of Ben, Sohunjna,	Hyperanthera Moringa.
Sun flower,	Helianthus Annuus.
Do. glaucous leaved physic nut,	Iatropha glauca.
Do. of star anise,	Illicium anisatum
Do. of jessamine,	Jasminum, (var, sp.)
Do. Chinese,	Kin.
Do. linseed	Linum usitatissimum.
Do of cajeput,	Melaleuca cajuputi.
Do. neem	Melia azaderach.
Do. of mint,	Mentha piperita.
Do. mimusops.	Mimusops elengi.
Do. ben,	Moringa pterygosperma.
Do. nutmeg,	Myristica moschata.
Do. of tobacco,	Nicotiana tabacum.
Do. fennel flower,	Nigella sativa.
Do. of keora	Pandanus odoratissimus.
Do. poppy seed,	Papaver somniferum.
Do. anise,	Pimpinella anisum.
Do. of pepper,	Piper nigrum.
Do. putchapat,	Pogostemon patchouli.
Do kurrunj,	Pongamia glabra.
Do. of (Prinsepia Utilis),	Ricinus Communis.
	Salvadara persica.
Do. castor,	Santalum album.
Do of sandalwood,	Sapindus emarginatus.
Do. poonga,	Sarcostigma kleinii.
Do. of sassafras,	Sassafras officinale.
Saul,	Shorea robusta.
Do. shayncotay,	Semecarpus anacardium.
Do. gingelly,	Sesamum indicum.
Do mustard,	Sinapis alba.
Chinese tallow tree,	Stillingia sebifera.
Oil pea	Suchaw.
Mustard Oil, of kinds.	
Kalee Surson	Species of Sinapis, &c.
Surson,	
Tira,	
Toria and Kurwa,	
Race,	
Do. fetid sterculia,	Sterculia fœtida.
Do. nux vomica,	Strychnos nux vomica.
Do. wild almond	Terminalia catappa.
Do. portia nut	Thespesia.
	Theobroma cacao.
Do. croton,	Tiglium officinale,
Do. vegetable tallow,	Vateria indica.
Kuttsella, Black till of Deccan, Kala-til-ke-tel,	Verbesina Sativa.
	Vernonia anthelmintica.
	Xylocarpus granatum. Sy Carapa moluccensis.

Madras Exhibition of 1857.

In addition, there are cotton-seed oil use for their lamps. Castor oil and Argemone see similarly used. Oil obtained from the fruit *Melia azadirachta*, &c, for medicine and lamp Apricot oil in the Himalayas, sunflower oil, of cucumber-seed for cooking and lamps, oil of colocynth seed, used as lamp oil. The seeds of bastard saffron (*Carthamus tinctorius*) yield oil. Mustard oil, the produce of various species of *Sinapis*, &c. Shanghae oil, from *Brassica chinensis*; Illiepie oil, from *Bassia longifolia*, which is used for frying cakes, &c., in Madras; and Mahwa oil, from another species of the same genus *Bassia latifolia*. Oil is expressed from the seeds of *Cæsalpina oleosperma*, a native of the East. The neem tree seeds afford a very clear or bitter oil, used for burning. Wood oil is a remarkable substance, obtained from several species of *Dipterocarpus*, by simply tapping the tree. The seeds of the *Argemone mexicana*, also contain a bland, nutritious, colorless, fixed oil. The mass from which the seed is expressed is found to be extremely nutritious to cattle. A solid oil, of a pale greenish color, a good deal resembling the oils of the Bassia in character, though rather harder, and approaching more in properties to myrtle wax, was shown at the Great Exhibition, from Singapore. It is supposed to be the produce of the tallow tree of Java, called locally "kawan," probably a species of Bassia. It is very easily bleached; indeed, by exposure to air and light, it becomes perfectly white; if not too costly, it promises to become a valuable oil. According to Mr. Low, there are several varieties of solid oil commonly used in the Islands of the Eastern Archipelago, and obtained from the seeds of different species of *Dipterocarpus*. Piney tallow is obtained from the fruit of the *Vateria indica*, a large and quick-growing tree, abundant in Malabar and Canara. It is a white solid oil, nsible at a temperature of 97 degrees, and makes excellent candles, especially when saponiied and distilled in the manner now adopted with palm oil, &c. It has one great advantage over coco-nut oil that the candles made of it do not give out any suffocating acrid vapors when xtinguished, as those made with the latter oil, do. An oil is produced from the inner shell of the cashew-nut *Anacardium occidentale* var. *ndicum*, in the East. In Japan a kind of butter alled *mijo*, is obtained from species of the Dalichos bean (*Dolichos soja*). The kernel of the eeds of the tallow tree of China, *Stillingia sebifera*, an evergreen shrub, contains an oil, which when expressed, consolidates through the old to the consistence of tallow, and by boiling ecomes as hard as bees' wax. The plant also ields a bland oil. A similar fatty product is btained from a shrub in British Guiana, the *Myristica* (*Virola*) *sebifera*. Oil is obtained in outh America from the sand box tree (*Hura crepitans*), and from the *Carapa guianensis*. The seeds f several plants of the cucumber family frequently pply a bland oil, which is used in the East as lamp oil and for cooking. Among the vegetale oils imparted into Ningpo, and other Chinese ports, from Shantong, Leatong, and Teisin, are oil of tenss, obtained from green and dried peas; black oil of the fruit of the tree *kin* (?) and oil from the pea of suchau. A pale brownish yellow oil is obtained from the seeds of *Carthamus tinctorius*, in Bombay, the seeds of which contain about 28 per cent. of oil. Excellent oil is expressed in various parts of India from the seeds of different species of *Sinapis*, especially from the black mustard seed. *S. glauca*, *S. dichotoma*, and *S. juncea* are extensively cultivated in the East for their oil. The *Erysimum perfoliatum* is cultivated in Japan for its oil seeds. A beautiful pale yellow oil is procured from the seeds of the angular-leaved physic nut. *Jatropha curcas*, a shrub which is often employed in the tropics as a fence for enclosures. It is used by the natives in medicine and as a lamp oil. About 700 tons of this oil was imported into Liverpool in 1850 from Lisbon, for the purpose of dressing cloth, burning, &c. An oil called Carab oil is also obtained in the East, from the almonds of *Xylocarpus granatum*, or *Carapa Moluccensis* of Lamarck, which is used by the natives to dress the hair and anoint the skin, so as to keep off insects. Cacao fat, the butter-like substance obtained from the seeds of *Theobroma cacao*, is esteemed as an emollient. The Agaiti, as it is called by the Portuguese, or napoota by the natives and Arabs (*Didynamia gymnosperma* ?), is much cultivated in all Eastern Africa for its oil, which is considered equal to that of olives, and fetches as high a price in the Indian market. The plant, which is as tall and rank as hemp, and equally productive, having numerous pods throughout the stems, is found everywhere in a wild as well as cultivated state. The "Cape Shipping Gazette," of August, 1850, says:—"The attention of the George Agricultural and Horticultural Society having been drawn to the fact that an excellent oil, equal to the olive oil of Italy, can be extracted from the kernel of the fruit known by the name of "T Kou Pijte" and "Pruim Besjee," they have offered a reward of £10 for the best sample, not less than a half sum of this oil—£15 if it shall be adjudged equal to the best oil of Italy. This fact is deserving of notice, as an instance of the advantages which are likely to result from the attention now being devoted to the natural productions of the colony." Cocum oil, or butter, is obtained from the seeds of a kind of Mangosteen (*Garcinia purpurea*), and used in various parts of India to adulterate ghee or butter. It is said to be exported to England for the purpose of mixing with bears' grease in the manufacture of pomatum. It is a white, or pale greenish yellow, solid oil, brittle, or rather friable, having a faint but not unpleasant smell, melting about 94 degrees, and when cooled after fusion remaining liquid to 75 degrees. An excellent solid oil, of a bright green color, is obtained from Bombay, having a consistence intermediate between that of tallow and wax, fusible at about 95 degrees, and easily bleached; it has a peculiar and somewhat aromatic odour. There is some uncertainty as to the plant from which it is obtained. It was referred to the *Salvadora persica*, and to the *Vernonia Anthelmintica* a plant common in Guzerat and the Concan Ghats. A pale yellow clear oil is obtained from the seed of *Dolichos biflorus* (?). Oil is also expressed in India from the seed of the *Argemone mexicana*, which is used for lamps and in medicine; and from the seeds of the cashew nut (*Anacardium occidentale*), from *Sapindus emarginatus*, and the country walnut (*Aleurites triloba*.) The fruit of the *Chirongia sapida*, (or *Buchanania latifolia*,) yields oil. From the seeds of the *Pongamia glabra*, or *Galedupa arborea*, a honey brown and almost tasteless oil is procured, which is fluid at common temperatures, but gelatinises at 55 degrees. Other sources of oil are the *Celastrus paniculatus*, *Balanites Egyptiaca* and the saul tree (*Shorea Robusta*).

Cinnamon suet is extracted by boiling the fruit of the cinnamon. An oily fluid floats on the surface, which on cooling subsides to the bottom of the vessel, and hardens into a substance like mutton suet. The Singhalese make a kind of candles with it, and use it for culinary purposes. It emits a very pleasant aroma while burning. According to the analysis of Dr. Christison, it contains eight per cent. of a fluid not unlike olive oil; the remainder is a waxy principle.

Croton oil is obtained by expression from the seeds or nuts of *Croton Tiglium*, tree, 15 to 20 feet in height, belonging to the same order as the castor oil plant, producing whitish green flowers, and seeds resembling a tick in appearance, whence its generic name. It is a native of the East Indies. 100 parts of seeds afford about 64 of kernel. 50 quarters of croton nuts for expressing oil were imported into Liverpool from the Cape Verd Islands, in 1849.

The *Croton Tiglium* grows plentifully in Ceylon, and the oil, if properly expressed, might be made an article of trade. The best mode of preparing it is by grinding the seeds, placing the powder in bags, and pressing between plates of iron; allow the oil to stand for fifteen days, then filter. The residue of the expression is triturated with twice its weight of alcohol, and heated on the sand-bath from 120 to 140 degs. Fahrenheit, and the mixture, pressed again. In this step the utmost caution is necessary in avoiding the acrid fumes. One seer of seed furnishes by this process rather more than eleven fluid ounces of oil, six by the first step, and five by alcohol. The oil acts as an irritant purgative in the dose of one drop. In large doses it is a dangerous poison. When applied externally it produces pustules. In 1845, eight cases of croton oil and six cases of the seed were exported from Ceylon. Other species of Croton as *C. Pavana*, a native of Ava and the north-eastern parts of Bengal, and *C. Roxburghii* yield a purgative oil. The bark of *C. Eleuteria* *C. Cascarilla*, and other species is aromatic, and acts as a tonic and stimulant. It forms the cascarilla bark of commerce already spoken of. When bruised, it gives out a musky odour and is often used in pastilles. The oil obtained from the seeds of *Jatropha curcas*, a native of South America and Asia, is purgative and emetic, and analagous in its properties to croton oil. It is said to be a valuable external application in itch. In India it is used for lamps. *Oil of Ben*, known as Sohunjuna in Bengal, and Moringa in Malabar is obtained from the seed or nuts of the horse-radish tree, the *Moringa pterygosperma*, Burmann; the *Hyperanthera Moringa*, of Linnaeus. This clear limpid oil having no perceptible smell, is much esteemed by watch-makers and perfumers; it is expensive and not often to be procured pure, consequently the oil would be a very profitable export. It grows rapidly and luxuriantly everywhere in Jamaica, particularly on the north side of the island—as well as in Trinidad and other quarters of the West. It is easily propagated either by cuttings from the tree (the branches) or by seeds, and bears the second year. The produce of each tree may be estimated at from one to two gallons. From the flowers a very pleasant perfume might be easily distilled. The following is the account of Dr. Hamilton. "It is a small tree, of about twenty feet in height, of most rapid growth, coming into flower within a few months after it has been sown, continuing to produce seeds and blossoms afterwards throughout th year. The tree is now naturalised in the Wes Indies. The timber is said to dye a fine blue and the gum, which exudes from wounds in th bark, bears a strong resemblance to that obtained from the *Astragalus tragacantha*, for which i might, no doubt, be substituted. The numerou racemes of white blossoms with which the tree i constantly loaded, are succeeded by long triangular pods, somewhat torulose at the ends, an about two feet in length, when arrived at the ful growth. These pods, while yet young and tender, are not unfrequently cooked and served up a the planter's tables like asparagus, for whic they are not a bad substitute. The pods, whe full grown contain about fifteen seeds; each considerably larger than a pea, with a membraneou covering expanding into three wings, whence th specific name of *pterygosperma*. On removi the winged envelope the seeds appear somewh like pith balls; but upon dividing them with th nail, they are found to abound in a clear, colo less, tasteless, scentless oil, of which the propo tion is so large that it may be expressed fro good fresh seed by the simple pressure of the na Geoffry informs us, that he obtained 30½ ounc of oil from eight pounds of the decorticated see being at the rate of very nearly 24 lbs. of oil from 100 lbs. of seed. Notwithstanding the great value of its oil, and the facility with which it can be obtained in the West Indies, the moringa has been hitherto valued there merely as an ornamental shrub, and cultivated for the sake of its young pods or the horseradish of its roots, as luxuries for the table. The oil is peculiarly valuable for the formation of ointments, from its capability of being kept for almost any length of time without entering into combination with oxygen. This property, together with the total absence of color, smell, and taste, peculiarly adapts it to the purposes of the perfumer, who is able to make it the medium for arresting the flight of those highly volatile particles of essential oil, which constitute the aroma of many of the most odoriferous flowers, and cannot be obtained by any other means, in a concentrated and permanent form. To effect this, the petals of the flowers, whose odor it is desired to obtain, are thinly spread over flakes of cotton wool saturated with this oil, and the whole enclosed in air-tight tin cases, where they are suffered to remain till they begin to wither, when they are replaced by fresh ones, and the process thus continued till the oil has absorbed as much as was desired of the aroma; it is then separated from the wool by pressure, and preserved under the name of *essence*, in well stopped bottles. By digesting the oil thus impregnated in alcohol, which does not take up the fixed oil, a solution of the aroma is effected in the spirit, and many odoriferous tinctures or waters, as they are somewhat inaccurately termed, prepared. By this process most delicious perfumes might be obtained from the flowers of the *Acacia tortuosa*, *Pancratium carribeum*, *Plumeria alba*, *Plumeria rubra*, and innumerable other flowers, of the most exquisite fragrance, which abound within the tropics, blooming unregarded, and wasting their odours on the barren air." Three varieties of til are extensively cultivated throughout India, for the sake of the fine oil expressed from their seeds, the white seeded variety, the parti-colored, and the black. It is from the latter that the sesamum or gingelly oil of Commerce is obtained Sesamum seed contains about 45 per cent. of oil. Good samples of the oil were shown at the Great Exhibition from Vizianagram, Ganjam, Hydrabad, Tanjore, the district of Moorshedabad, and Gwalior. The gingelly seed is stated to be worth about £4 per ton in the North Circars. An oil resembling that of sesamum is obtained from the seed of *Guizotea oleifera* or *Abyssinica*, a plant introduced from Abyssinia, and common in Bengal. The ram til, or valisaloo seeds, yield about 44 per cent of oil. The oil is generally used for burning, and is worth locally about 10d. per gallon. BLACK TIL (*Verbesena sativa*) is known as kutsela or kala til, in the Deccan. It is chiefly cultivated in Mysore and the western districts of Peninsular India, as well as in the Bombay presidency. About Seringapatam, as soon as the millet crop has been reaped the field is ploughed four times, and the seed sown, a gallon per acre, during the month of July or August, after the first heavy rain. No manure or weeding is required, for the crop will grow on the worst soils. It is reaped in three months, being cut close to the ground, and stacked for a week. After exposure to the sun for two or three days, the seed is beaten out with a stick. The crop in Mysore rarely yields two bushels per acre, but about Poonah the produce is much larger. The seed is sometimes parched and made into sweetmeats, but is usually grown for its oil. This is used in cooking, but it is not so abundant in the seed, nor so good as that of the sesame. Bullocks will not eat the stems unless pressed by hunger. About 5,000 maunds are exported annually from Calcutta. 3,730 bags were imported into Liverpool in 1851. The price per quarter of eight bushels, in January, 1853, was from 30s. to £2; of teel oil, in tins, weighing 60 to 100 pounds, £2 to £2 4s. Bombay linseed was worth £2 11s. to £2 12s. the quarter of eight bushels, in January, 1853. Bengal ditto 2s. less. The imports into Liverpool were 68,468 bags and 54,834 packets in 1851, and 14,490 bags and 33,700 packets in 1853. About 9,000 bags of mustard seed and from 18,000 to 20,000 bags of rape seed are also imported thence. The price of the latter is about £2 the quarter.

Coco-nut oil.—The chief oil made on the sea board of India, is that yielded by the coco-nut palm. The nut having been stripped of the husk or coir, the shell is broken, and the fatty lining enclosing the milk is taken out. This is called cobri, copra, or copperah in different localities. Three maunds, or ninety pounds of copperah, are thrown into the mill with about three gallons of water and from this is produced three maunds, or seven and three-quarter gallons of oil. The copperah in its unprepared state is sold, slightly dried in the market. It is burned in iron cribs or grates, on the top of poles as torches, in processions, and as means of illumination for work performed in the open air at night. No press or other contrivance is made use of by the natives in India for squeezing out or expressing the oil from the cake, and a large amount of waste, in consequence of this necessarily ensues. *Bombay Times, June* 5, 1850. See Cocos.

Apricot oil.— Oil of the finest kind, is made in India by expression from the kernels of the apricot. It is clear, of a pale yellow color, and smells strongly of hydrocyanic acid, of which it contains, usually, about 4 per cent.

Sun flower oil.—"On inquiring into the use made of the sunflower, we were given to understand that it is raised in Tartary chiefly for the oil expressed from it. But it is also of use for many other purposes. In the market places of the larger towns we often found the people eating the seeds, which, when boiled in water, taste not unlike the boiled Indian corn eaten by the Turks. In some districts of Russia the seeds are employed with great success in fattening poultry; they are also said to increase the number of eggs more than any other kind of grain. Pheasants and partridges eat them with great avidity, and they cause the same effects on them as other birds. The dried leaves are given to cattle in place of straw; and the withered stalks are said to produce a considerable quantity of alkali."—*Bremner's Interior of Russia.* 658 barrels linseed oil were brought down to New Orleans from the interior in 1849, and 1009 in 1848.

Linseed oil.—During the period of the Great Exhibition special enquiry was made by many manufacturers as to the different oils of Southern India, suitable for supplying the place of animal fat in the manufacture of candles, and generally adapted for various other purposes. Enquiries should be directed to the specific gravity, the boiling point, the per centage of pure oil in the seeds, and the means of obtaining a regular supply. The demand for vegetable oil in European commerce has been steadily on the increase for several years past, and the quantities consumed, are now so large that the oleaginous products of India and the colonies must sooner or later have a considerable commercial importance, from the value which they are likely to acquire.

Margosa, or Neem Oil.—From the pericarp or fleshy part of the fruit of the *Melia azaderachta*, and of the Azaderachta indica the well known Margosa oil is prepared; which is cheap and easily procurable. Dr. Maxwell, when garrison surgeon of Trichinopoly, stated that he has found this oil equally efficacious to cod-liver oil in cases of consumption and scrofula. He began with half-ounce doses, morning and evening, which were gradually reduced.

Bassia oils.—The seeds of three species of Bassia, indigenous to India, yield solid oils, and are remarkable for the fact, that they supply at the same time saccharine matter, spirit, and oil, fit for both food and burning in lamps.

a. The *Illepe* (*B. longifolia*) is a tree abundant in the Madras Presidency, the southern parts of Hindostan generally, and the northern province of Ceylon. In Ceylon the inhabitants use the oil in cooking and for lamps. The oil cake is rubbed on the body as soap, and seems admirably adapted for removing the unctuosity of the skin caused by excessive perspiration, and for rendering it soft pliable, and glossy, which is so conducive to health in a tropical climate. The oil is white and solid at common temperatures, fusing at from 70 to 80 degrees. It may be advantageously employed in the manufacture of both candles and soap; in Ceylon and some parts of India this oil forms the chief ingredient in the manufacture of soap.

b. *Mahwa* (*B. latifolia*) is common in most parts of the Bengal Presidency. The oil a good deal resembles that last described, obtained from the Illepe seeds; and may be used for similar purposes. It is solid at common temperatures, and begins to melt at about 70 degrees.

c. *Vegetable butter* is obtained from the Choorie (*B. butyracea*). This Bassia though far less generally abundant than the other two species, is common in certain of the hilly districts, especially in the eastern parts of Kumaon; in the province of Dotee it is so abundant that the oil is cheaper than ghee, or fluid butter, and is used to adulterate. It is likewise commonly burnt in lamps, for which purpose it is preferred to coco-nut oil. It is a white solid fat, fusible at about 120 degrees, and exhibits very little tendency to become rancid when kept.

d. *Shea, or galam butter*, is obtained in Western Africa from the *Bassia Parkii* or *Pentadisma butyracea*, a tree closely resembling the *B. latifolia* and other species indigenous to Hindostan. According to Park, the tree is abundant in Bambara, the oil is solid, of a greyish white colour, and fuses at 67 degrees. Its product is used for a variety of purposes—for cooking, burning in lamps, &c. This tree has much of the character of the laurel, but grows to the height of eighteen or twenty feet. Its leaf is somewhat longer than the laurel, and is a little broader at the point; the edges of the leaf are gently curved, and are of a dark sap green color. The nut is of the form and size of a pigeon's egg, and the kernel completely fills the shell When fresh it is of a white drab color, but, it long kept, becomes the color of chocolate. The kernel, when new, is nearly all butter, which is extracted in the following manner:—The shell is removed from the kernel, which is also crushed, and then a quantity is put into an earthe pot or pan, placed over the fire with a portion o water and the nut kernels. After boiling slowl about half an hour the whole is strained throug a grass mat into a clean vessel, when it i allowed to cool. Then after removing the fibrous part from it, it is put into a gras bag and pressed so as to obtain all th oil. This is poured into the vessel alon with the first-mentioned portion, and whe cold is about the consistence of butter. Th nuts hang in bunches from the differen boughs, but each nut has its own fibre, abou seven or eight inches long, and about th thickness and color of whip-cord. The nut is attached to the fibre in a very singular manner. The end of the fibre is concealed by a thin membrane, about half an inch wide and three-quarters of an inch long. This membrane is attached to the side of the nut, and, when ripe, relinquishes its hold, and the nut falls to the ground, when it is gathered for use. A good-sized healthy tree yields about a bushel of nuts, but the greater number are not so prolific. The trees close to the stream present a more healthy appearance, probably on account of being better watered, and the fire being less powerful close to the stream.—*Simmonds.* The collection of oils exhibited at the Madras Exhibition of 1855, by Lieut. Hawkes, was very extensive, and contained a very large number of highly interesting specimens. The series exhibited the oleaginous products in a state of great purity, accompained by the oil seeds yielding them. No consideration of cost or trouble had been allowed to interfere with providing all that was necessary to render the collection a complete illustration of the oils of Southern India. The value of the collection was greatly enhanced by the care which had been bestowed in the preparation, and the exclusion of all impurities in the process of extraction.—*M. E. R. J.* This officer, as Reporter to the Jury, on the Sub Class "*oils,*" published in the Reports of the Juries of the Exhibition, furnished observations on the extensive collection of oils, himself and others exposed. For the opportunity of having this done however, Southern India is indebted to Lord Harris, to whom this part of the Empire owes more for the practical development of its productive resources, than to any one since the days of James Anderson, Buchanan Hamilton, Heyne, Roxburgh and Ainslie by whom their existence was first made known. From the General and Local Exhibitions which as Governor of Madras he caused to be held in 1855-56 and 1857, the Commercial world and men of Science have been indebted for the learned essays, in the Juries Reports which emanated from Dr. H. F. C. Cleghorn, M. D. Dr. A. Hunter, M. D. Lt. H. P. Hawkes, Dr. A. J. Scott, M.D. Lieutenant Colonel Balfour, C.B. and Colonel G. P. Cameron, C.B.K.T. and K.C.

The *Adul oil* of Travancore was forwarded to he Great Exhibition of 1851, but merits further ttention It seems to be medicinal, but the Botanical name of the plant producing it is not iven.

(5741) *Aleurites Triloba.* Belgaum Walnut oil.

Hidjlee Badam Ka tael, Hind.

The Molucca tree which produces the "Lum-ang nut" grows plentifully near Hydrabad. he nuts yield a very large per centage of Oil, nd the tree is found to be very prolific. The uts are said to be strong upon a thin strip of amboo, and when lighted will burn like a can-e; a notice of this interesting substance may be found in the Transactions of the Agri-Horticultural Society of India. (Vol. 8. p. 220.)—*M. E. J. R.*

(5742) *Allium sativum.* Garlic Oil.

Vellay-Poondoo yennai, Tam.

Good specimens of this medicinal oil were exhibited by Major Miller, the Madras Tariff and Lieut. Hawkes.—*M. E. J. R.*

(5743) *Anacardium occidentale.* Cashew nut oil.

Moondree cottay yennai, Tam. | Kajoo ka tael, Hind

The light yellow, sweet tasted and edible oil obtained from the *nut* of this tree, is in every respect equal, if not indeed superior, to either Olive or Almond oil. It is very seldom prepared, the nuts being used as a table fruit.—*M. E. J. R.*

(5744) *Anacardium occidentale. Cashew Apple Oil.* This powerfully vesicating oil obtained from the pericarp of the Cashew Apple has been long known to the Native Physicians, and much resembles in its properties the acrid oil obtained from the marking nut (Semecarpus Anacardium).—*M. E. J. R.*

(5745) *Andropogon Calamus Aromaticus.*—Roosa Grass Oil. This Oil differs but little either in appearance or quality from the Lemon Grass Oil. It is used for the same purposes.

(5746) *Andropogon Schœnanthus.*—Lemon Grass Oil.

Camaehie Pilloo Tylum, Tam.

This well known Oil is obtained by distillation from a grass, which grows plentifully in many parts of the country. It is much used as a rubefacient for Rheumatic affections, as well as in Perfumery, for which purposes it is said to be largely exported from Travancore. When newly made, this Oil is of a light straw color, but age changes it to a deep red. Excellent specimens are exhibited by the Travancore and Tanjore Local Committees and by Lieut. Hawkes. Mrs. Goodsir forwarded an excellent sample obtained from Ceylon.

(5747) *Anethum Sowa.*—Bishops Weed Oil. These well known carminative seeds yield by distillation a very useful Oil which is given medicinally, as a stomachic. Good specimens were shown by Mr. Gay, the Tanjore Local Committee and Lieut. Hawkes.

ANIMAL OILS.

(5748) *Fish Oil.*—The preparation of fish oil is chiefly confined to Malabar and the Western Coast whence it is exported to England in large quantities, the demand is also yearly increasing.

(5749) *Fish Liver Oil.*—Is also prepared chiefly on the Western Coast although some is now made at Madras. The liver of the white shark is that generally used. The mode of preparing the best Cod liver oil which is equally applicable to "Fish liver" is thus described.

"*Cod Liver Oil.*"—The proper season for preparing this oil is early in January when the livers are plump, firm, large, white, and full of oil—the livers are sometimes found diseased, and are specifically lighter than water, these should be rejected. Good livers should cut smooth, and not tear, when cut none of the substance should flow out in a half liquid state. The quantity of oil produced by livers depends much upon the time of the year. In the beginning of January 1000 livers were found by experiment to yield 37 Imperial gallons, and at the end of February an equal number only gave 23 gallons of oil. In the beginning of January 1000 livers of average size weighed 900 lbs. whilst in the last day of March the same number weighed only 575 lbs. The oil at these different seasons was equally pale, and the livers equally white, although much smaller and more flabby in the latter season. To prepare the oil—Wash the liver very carefully, first removing the gall bladders which adhere to them, and infuse them in rain or other water free from salt. Place them over the fire and never allow the heat to exceed 120 or 130°. On this head espacial care must be taken, a higher degree of heat although yielding a larger product, communicates a rank fleshy taste and smell and heightens the color of the oil, thereby rendering it disgusting to the patient.

(5750) *Neats foot Oil.*—Its uses as a softener of leather, &c &c. are well known.

(5751) *Oleum Ceræ Oil of Wax.*—Bees wax submitted to destructive distillation with the addition of a little salt yields an empyreumatic oil which is much used in medicine by Native Doctors.

Guana Oil.—A specimen of this oil is exhibited by J. Rohde, Esq. of Guntoor.

(5752) *Arachis hypogea. Ground nut Oil.*

Vayr-cuddala-yenai, Tam. Manilla noona, Tel.	Willayettie-moong kiephullie-ka tel, Hind.

This valuable oil, which of late years has been exported from Madras to a large amount, is obtained by expression from the seeds of the Ground or Manilla nut, which is now cultivated to a considerable extent in most parts of the Peninsula. In the year 1848-49—37,000 gallons were shipped, but in the two following years the Exports exceeded 1,00,000 gallons. It has however fallen to 57,207 gallons in 1852-53. It does not seem to be consumed to any large extent in this country, although the nut itself is much eaten by the poorer classes. It is said to be used for adulterating gingely oil in North Arcot, where it costs from Rs. 1-8-0, to 2-12-0 per maund. In the Nellore District, the seeds are procurable at Rs. 1-8-0 per maund and in Tanjore about 200 acres are cultivated, producing annually 75 candies of oil at Rs. 2-6-9 per maund. The seeds yield about 43 per cent. of a clear straw coloured edible oil, which is an excellent substitute for olive oil, and makes a good soap. Its value in London in January 1855 was £47-10 per ton. Perfect decolorization, far from depreciating, considerably enhances the value of this oil.—*M. E. J. R.* See GROUND NUT.

(5753) *Argemone mexicana.* Brumadundoo or Coorookoo oil. Prickly Poppy; Jamaica yellow thistle.

Brumadundoo yennai, Tam. Brumadundie Noona, Tel.	Faringie datura ka tael. Hind.

This pale yellow limpid oil may be obtained in large quantities from the round corrugated seeds of the prickly poppy, which was originally introduced from Mexico in ballast, but now flourishes luxuriantly in all parts of India It is sometimes expressed by the natives and used in lamps, but is doubtless adapted to other and more important uses. In North Arcot it costs from Rs. 1-14-0 to Rs. 2-1-0 per maund.—*M. E. J. R.*

(5754) *Bassia Longifolia.* Illoopoo Oil.

Illepie Yennai, Tam.	Mohay ka tel, Hind.

This semi-solid oil is expressed from the seeds of a tree which is everywhere common in Southern India. It is seldom sold in the bazar, but the seeds are collected, and the oil manufactured by the Natives for private consumption. The seeds contain about 30 per cent of oil of a bright yellow colour. It is procurable in South Arcot at Rs. 25 per candy, or Rs. 1 4 0 per maund—in Bellary at 3 8 0, in Bhopaul at Rs. 3 12 0. In Tanjore, it may be had to the extent of 2,702 candies at the rate of 2 8 8 per maund.

Uses.—This oil makes excellent candles an soap. Of the latter, several specimens were contributed (Cl. xxix) from Tanjore, Madras, &c. Its chief use is, however, for burning in lamps and as a substitute for butter in Native cookery The very great difference in colour, consistenc and flavour, which is observable in the man specimens of this oil entirely attributable to th mode of preparation, and to the presence in som cases of a very large proportion of mucilage an other extraneous matter. A bright colored spec men from Tanjore, on being treated with dilut sulphuric acid, proved remarkably pure, sampl of the same oil, from Rajhamundry and Tinnevell and from Lieut. Hawkes were equally goo but those from Nellore and Mysore deposited large amount of mucilage.—*M. E. J. R.*

(5755) *Bassia Latifolia.* Mahwa Oil. Seve al specimens of oil under this name were exhibi ed, at the Madras Exbutition of 1855 but doul existed as to their being really the produce the B. latifolia, which has always been describ as a solid oil or butter, whereas those no shown are quite liquid at ordinary temperatu

The B. latifolia is produced plentifully in Bengal, but it is not yet ascertained that it grows in the Madras Presidency.—*M. E. J. R.*

(5756) *Bombax pentandrum.* Silk Cotton seed Oil. A dark brown though clear oil is obtained by expression from the seed of the silk cotton tree, the fibre of which is largely used as a stuffing for pillows, mattresses, &c. &c.

(5757) *Bryonia Oil.*

Toomuttikai yennai, TAM.	Boddama kaia noona, TEL

This oil is used for burning in Lamps in some parts of the country, where the fruit abounds. It is extracted by boiling in water, and is procurable only in very small quantities.—*M. E. J. R.*

The *Broonya Malugum Ointment* and the *Vishnamoosty or snake tree ointment* of Masulipatam ppear to be new products, but being unaccompanied with any information as to source from which they are derived, this cannot be accurately letermined.

(5758) *Butea Frondosa.* Moodooga Oil. The seeds of this tree yield a small quantity of a right clear oil which is sometimes used medi-inally.—*M. E. J. R.*

(5759) *Cabbage seed Oil.* Exhibited in the Madras tariff.—*M. E. J. R.*

(5760) *Calophyllum calaba*? A new oil under he name of *Cherroo Pinnacottay* is sent from Cochin.

Major Miller, Assistant Commissary General, Bangalore, forwards a new oil under the ame of "Pootronjie." The same oil was lso shown by Mr. Rose of Madras and Lieut. Iawkes.

(5761) *Calophyllum inophyllum.* Pinnacotay r Poon-seed oil.

'innay yennai, TAM. 'innay noona, TEL,	Surpuuka tael, HIND.

The fresh seeds of the "Alexandrian laurel" hen shelled, and subjected to pressure yield a ark green oil of a peculiar odour. Old seeds ield a higher colored and thicker product. In ne year 1847-48, Galls 3,871 of the oil, and wt. 508 of the seeds, were shipped from Madras hiefly to Ceylon and the Straits, it has now ceased be an article of Export. In Tanjore, 437 acres roducing on an average 24⅝ cullums per acre of ed are covered with this tree : this yields 2671¼ aunds of oil at Rs. 20-4 per maund. In Tinevelly, it costs As. 4-8 and Trichinopoly As. 4 er seer. In Tanjore, it is used for Lamps, and r caulking vessels, but it appears to be chiefly luable as a medicine. It is seldom procurable the bazar, but is expressed when required. amples from Canara, under the name of "Hoy," from Goa by the name of "Oleum unda," om Cochin called "Perun Poonaka," and from asulipatam.—*M. E. J. R.*

(5762) *Cannabis sativa.* Hemp seed oil.

Ganja yenna, TAM.

This oil is obtained by expression from the seeds of the common hemp, which is cultivated in many parts of the country. In Russia, the oil is much used for burning in Lamps, but it is unknown to the natives of India. Three specimens are exhibited, one of a deep green colour from Tanjore, another of an olive green sent by Lieut. Hawkes and the third in the Madras Tariff.—*M. E. J R.*

(5763) *Cardamom seed Oil.* (Fixed.) This is sent as a "new oil" by Mr. Rose, but is already well known.

(5764) *Carthamus tinctorius.* Safflower oil.

Chendoorookoo yennai, TAM. Koosumba noonay, TEL.	Kurrur or Coosum ka tael, HIND.

A light yellow clear oil obtained from the seeds of the plant, yielding the well known dye. It grows plentifully in Mysore and Tinnevelly. In Mysore and Bellary, it costs about Rs. 2-8-0 per maund, and is used for lamps, culinary and other purposes.—*M. E. J. R.*

(5765) *Celastrus paniculata.* Malkungunee or staff t, ee oil.

Valuluvy yennai, TAM. Bavungie noona, TEL.	Malkungunee ka tael, HIND.

The deep scarlet colored oil obtained by expression from the seeds of this shrub is used in medicine, the seeds submitted to destructive distillation yield the oleum nigrum.—*M. E. J. R.*

(5766) *Celastrus Paniculata.* Oleum Nigrum.

Vaylaric tylum, TAM.

An empyreumatic oil obtained by the destructive distillation of the seeds of this Celastrus, either alone or in combination with other ingredients. It is much used in the treatment of Beri-beri, Malcolmson's Essay, p. 312.

(5767) *Cheerongie Oil Chirongia sapida or Buchanania Latifolia.*

Saraypuppoo noonay, TEL.	Cheeronjie or Charoolie ka tael, HIND.

The kernels of this tree are eaten by the natives to promote fatness, they abound in a straw colored, sweet tasted and limpid oil which is seldom extracted. The tree grows plentifully in Mysore and Cuddapah.—*M. E. J. R.*

(5768) *Cocos nucifera.* Cocoanut oil.

Taynga yennai, TAM, Tencaya Noona, TEL.	Narel-ka-Tel, HIND.

The average annual quantity of this oil exported from Madras, from 1847-48 to 1852-53 is about Galls 9,00,000 per annum. Of this by far the largest portion is sent to the United Kingdom and France, the remainder finds its way to Arabia, Mauritius, Bombay and the (Indian) French Ports.

Price.—The prices of this oil vary considerably in different parts of the country. For the quarter ending 31st October 1854, the max: and the min: were Rs. 8-5-4 at Jubbulpore, and Rs. 1-12-9 at Mhow per maund. The average of twenty one large stations in the Madras Presidency giving Rs. 4-9-5 per maund, or about £41-2 per ton. The market-value of "Cochin oil" in London (January 1855) was £46. 10—the average being £46 to 48. The best oil is that exported from Cochin, and the neighbouring ports on the Malabar Coast. It usually fetches 20*s*. per ton more than the Ceylon or Coromandel coast article.

Uses. In Europe, for Candle and soap manufacture, for lubricating machinery, &c. &c. In India, for making soap, anointing the person, for cookery, lamps and in medicine.—*M. E. J. R.* See Cocos. W. E. Underwood, Esq., exhibits an empyreumatic oil and pyroligneous acid obtained by the destructive distillation of cocoanut shells. The latter substance has been used successfully in developing photographs by the collodion process. The oil or tar mixed with ordinary "japan varnish" is said to be used with advantage in the "backing up" of positive pictures.

(5769) *Croton tiglium.* Croton or Napaulah oil.

Neervalum yennai, Tam. Naypalum vittiloo, Tel.	Jumal-gotay-ka tael, Hind.

This is a well known medicinal oil, the use of which as a drastic purgative, seems to be decreasing.—*M. E. J. R.*

(5770) *Cucumis Colocynthis.* Colocynth seed Oil.

(5771) *Cucumis melo*, Melon seed Oil. Pitcha Pusjhum—Tharbooza, Khurbooza, Pumpkin seed Oil.

(5772) *Cucurbita pepo*, Cucumber seed Oil.

Valerikoi yennai, Tam.	Thosa noona, Tel.

A clear edible oil.—*M. E. J. R.*

(5773) *Garcinia pictoria*, Gamboge Butter. (Rox.)

Mukki-tylum, Tam.	Arasinagoorghy yennai, Can.

The solid butter contained in the seeds of the "Gamboge tree" a species closely allied to the G. purpurea which produces the "cocum butter" has attracted attention. The Gamboge tree grows abundantly in certain parts of the Mysore and Western coast jungles. The oil which is procurable in moderate quantities, is prepared by pounding the seed in a stone mortar and boiling the mass, until the butter, or oil rises to the surface. Two and a half measures of seed should yield one seer and a half of butter. In the Nuggur Division of Mysore, it is sold at the rate of As 1-4 per seer of 24 Rs. weight, or at £36-6 per ton, and is chiefly used as a lamp oil by the better classes of natives, and by the poor as a substitute for ghee. The butter thus prepared does not appear to possess any of the purgative qualities of the Gamboge resin, but is considered an antiscorbutic ingredient in food. The above interesting particulars have been furnished by H. R. Oswald, Esq. M. D. Nuggur Divison, Mysore Commission.—*M. E. J. R.*

(5774) *Ghirgilly Oil.* From Canara obtained from the pulp of the tree; considered an excellent remedy for Rheumatic pains.

(5775) *Guilandina Bonduc.* Bonduc nut Oil.

Calichikai yennai, Tam.

The oil of this common seed is mentioned by Ainslie, as being considered useful in convulsions and palsy. The seeds themselves are believed to possess tonic virtues. Used solely as a medicine.—*M. E. J. R.*

(5776) *Guizotia oleifera*, Ramtill oil—Vebesina sativa.

Valeesaloo Noonay, Tel.	Kala Till ka Tael, Hind.

This sweet tasted edible oil is plentiful in the Mysore, Vizagapatam and Ganjam Districts. It is used for nearly the same purposes as the sesamum. It is procurable in the Nuggur Division of Mysore at Rs. 3 8 0 per maund, but is considered inferior to gingely oil.—*M. E. J. R.*

(5777) *Hura Crepitans.* Sand Box tree oil, The seeds of this tree (which has been introduced from Jamaica) yield by expression an oil, as the whole tree abounds in poisonous matter, this oil probably partakes of its deleterious nature. The tree grows in the Madras Horticultural Gardens.

(5778) *Hydnocarpus inebrians.* Thortay Oil. From Canara a very valuable vegetable tallow, used for sores.

(5779) *Inga dulcis.* Coorookoopilly Oil. The seeds of this common hedge plant yield by expression a light coloured oil, about the consistence of castor oil. Its qualities and uses require to be ascertained.

(5780) *Iatropha* (*Curcas*) *Purgans.* Angular-leaved Physic-nut Oil.

Caat-amunak yennai, Tam. Adevee amedapoo noona, Tel.	Junglie erundie ka tel, Hind.

This oil, which has of late been imported int England, as a substitute for Linseed oil, is expressed from the fruit of a species of Iatropha which abounds in all parts of the Madras Presidency. The colour is somewhat paler than the bes linseed oil. It can be obtained in some parts o the country where it is plentiful, for little mor than the cost of manufacture. It is now chiefl used in lamps. A light straw colored specime was shown by Lieutenant Hawkes and severa good but rather high colored samples from th

Tanjore and Travancore Local Committees and the Madras Tariff.—*M. E. J. R.*

(5781) *Jatropha glauca.* Glaucous leaved Physic nut Oil.

Addale or Authaulay yennai, Tam.

This oil which in appearance approaches castor seems to be but little known. It is fluid and light straw colored, and is procurable in South Arcot, where the plant grows on waste land. It is now chiefly used medicinally as a counter irritant, but if procurable in sufficient quantity seems likely to prove an useful oil. A high colored specimen was sent from Tinnevelly and one of a pale straw colour from Lieutenant Hawkes. —*M. E. J. R.*

(5782) *Lepidium sativum*—Country Cress Oil.

Alie-verie yennai, Tam.

This oil is extracted from the seeds of the "Chinese wall cress." Its qualities and uses have yet to be determined. It must not be confounded with "Linseed oil" the Tamil name of which is the same as that of the present article.

(5783) *Linum usitatissimum.* Linseed oil.

Alliverie yennai, Tam. | Ulsee ka tael, Hind.
Avecsee noona, Tel. |

The seed from which this oil is expressed, has long been cultivated to a limited extent in Nagpore, Bellary and other parts of the Madras Presidency. There is an impression that the oil obtained from the Indian plant is inferior to that imported from England, but it will be found on experiment, that this arises from the former having been imperfectly freed from mucilage, which prevents its drying. The seed s now an article of export from Madras to the amount (1852-53) of cwt. 1,106. In the year 1852-53, English Linseed oil to the amount of galls 4-552 and valued at Rs. 8.763 was imported into Madras, whilst at the same time cwt. 1,045 of the seed were exported from hence mostly to England : it appears that it can be made on the spot for much less than the average value of the English oil. This fact, it is hoped, needs only to be pointed out, to be taken advan-age of. It would, however, be necessary to guard against the adulteration of this oil, with ny of the other greasy oils which would of ourse infallibly destroy its drying properties. —*M. E. J. R.* See Flax.

(5784) *Macassar Oil.* The qualities of this il which is said to have been obtained from Macassar, the capital of the Celebes Island, reuire to be determined, it is used by the natives f Singapore as a hair oil.

(5785) *Manaloo Oil.* From Canara used for amps.

(5786) *Azadirachta Indica; et Melia Azadirach.* Margosa or Neem oil

Vaypum yennai, Tam. | Neem ka Tael, Hind.
Vapa noona, Tel. |

This valuable and much used medicinal oil is obtained by either expression or boiling, from the seeds of the above mentioned trees, which are common throughout Southern Asia. It enters much into the practice of native Physicians, by whom it is administered internally as an anthelgmintic, and externally as a liniment in Rheumatism, headache and as an application to ulcers. The oil is of a deep yellow colour, has a stronsmell and an unpleasant bitter taste. In the year 1847-48 galls 1,587 were exported from Madras, and in the year 1851-52, galls 1,917, in 1852-53, galls 3,111. The chief market is Ceylon, but the demand is not constant.—*M. E. J. R.*

(5787) *Mesua Ferrea.* Naga-sumpunghee Oil. This valuable oil is procurable in Canara, at the rate of Rs. 4 and the seed at 1-8-0 per maund. It is used both as a lamp oil and as a healing application to sores.

(5788) *Mimusops elengi.* Mimusops Oil. A medicinal oil. Obtainable in tolerably large quantities in some parts of the Country. It is known in England.—*M. E. J. R.*

(5789) *Mooroogana tallow.* This valuable substance which even at high temperatures is perhaps the most solid oil with which we are yet acquainted, was forwarded from Canara by F. N. Maltby, Esq. If procurable in large quantities, and at a moderate cost, it promises to be a valued material for the manufacture of candles, &c. &c. It is used for medicinal purposes, &c. &c. and as a cure for cattle wounded by Tigers.

(5790) *Hyperanthera moringa* : *Moringa Pterygosperma.* Ben or Moringa oil.

Morunghy yennai, Tam. | Sahujna, Hind.
Morunga noona, Tel. |

Ben nut oil has long been considered valuable on account of the lengthened period, which it may be kept without contracting rancidity. The tree from which the "nuts" are obtained, is common in all parts of the country, the flowers, leaves and fruit are eaten by the natives, and the rasped root is used by Europeans as a substitute for horse-radish, to which circumstance it owes its common name of "horse-radish tree." The oil however is seldom made in India, nor does it now form an article of export.—*M. E. J. R.*

(5791) *Myristica Moschata*, Nutmeg butter.

Jadipootrie tylum, Tam. | Japhul ka tael, Hind.
Jajikarra noona, Tel. |

Is obtained by expression from the nutmeg, it has an aromatic smell from the volatile oil it contains.

(5792) *Neeradimooloo oil.* Neerada.

Mootoo yennai, Tam. | Junglie badam ka tael, Hind.

This valuable oil was sent to the Exhibition under the various names of Neeradee-mootoo, jungle Almond, Maroty, Tamana, Maravettie, Neervettie and Soorty. It is said to be in great repute, as a medicine amongst native practitioners, and the kernel enters largely into their prescriptions. It might probably be found of use in the arts, it much resembles almond oil but is rather thicker. The seeds cost in Madras As. 2–6 per seer.—*M. E. J. R.*

(5793) *Nigella sativa.* Fennel Flower Oil.

Carun Seeragum, Tam.
Nulla Gillikarra, Tel.
Kulonjee and Siah Danah, Hind.

The black aromatic seeds of the nigella sativa, yield by expression a dark colored fragrant oil. —*M. E. J. R.*

(5794) *Papaver somniferum.* Poppy Oil.

Cas casa yennai, Tam.
Casa-casa noona, Tel.
Khush-khush ka tael, Hind.

The poppy is largely cultivated throughout Malwa and the Opium districts, where the drying oil obtained from the seed is more extensively used than any other, both in lamps and as food. At Bhopaul the oil is procurable at the rate of Rs. 4-8-0 per maund of 25lbs. or £40-6 per ton By simple exposure to the rays of the sun in shallow vessels, this oil is rendered perfectly colourless. It is much prized by European artists. —*M. E. J. R.*

(5795) *Olive*, Wild, or Pootroojie Oil. Obtained by expression from a handsome tree growing plentifully in Canara and Mysore.

(5796) *Polanisia Viscosa.* Viscid Cleome Oil.

Nahi-cadaghoo, Tam.

This warm and pungent little seed when subjected to very powerful pressure, yields a moderate per centage of a light olive green colored limpid oil, which promises to be useful for purposes requiring a very liquid oil.

(5797) *Poonga or Kurunj Oil.* Dalbergia arborea or Pongamia Glabra.

Poonga yennai, Tam.
Kanoogoo noona, Tel.
Kurunj ka tael, Hind.

This oil, which in some parts of the Country is used to a large extent in adulterating lamp oil, is expressed from the seeds of a tree, common in most parts of the Madras Presidency. In North Arcot, Bellary, and the Nuggur Division of Mysore, the oil is procurable at Rs. 2-8-0 per maund. It is chiefly used as a lamp oil by the poorer classes.—*M.E.J.R.*

(5798) *Sahcottay Oil.* From Canara, used for cutaneous diseases.

(5799) *Santalum album.* Sandal seed Oil.

Chundana pusjhum yennai, Tam.

The seeds of the sandal wood tree yield by expression a thick and viscid oil which is burnt by the poorer classes in lamps.

(5800) *Santalum album.* Sandalwood Oil.

Chundana yennai, Tam.

Specimens of this oil are exhibited by the Salem and Canara Local Committees, the Madras Tariff and Lieut. Hawkes. The exports amount annually to about 100 cwt.

(5801) *Raphanus sativus.* Radish seed Oil. Exhibited in the Madras Tariff.—*M.E.J.R.*

(5802) *Ricinus communis, Castor Oil.* Fructibus minoribus.

Sitt-amunakei yennai, Tam.
Chitt-amindialoo noona, [Tel.
Bareek erundie ka tel, Hind.

Two varieties of the Ricinus communis, one bearing small and the other large seeds, are produced all over India. The small seeded variety yields the best product, and is employed in preparing the oil exported for medicinal purposes.

Mode of Preparation.—The fresh seeds after having been sifted and cleaned from dust, stones, and all extraneous matters, and slightly crushed between two rollers, freed by hand from husk and coloured grains, are enclosed in clean gunny. They then receive a slight pressure in an oblong mould which gives a uniform shape and density to the packets of seed. The "Bricks" as they are technically called, are then placed alternately with plates of sheet iron in the ordinary screw or hydraulic press. The oil thus procured is received in clean tin pans, and water the proportion of a pint to a gallon of oil being added, the whole is boiled until the water has evaporated, the mucilage will be found to have subsided and encrusted the bottom of the pan, whilst the albumen solidified by the heat, forms a white layer between the oil and the water. Great care must be taken in removing the pan from the fire, the instant the whole of the water has evaporated, which may be known by the bubbles having ceased, for if allowed to remain longer, the oil which has hitherto been of the temperature of boiling water or 212°, *suddenly* rises to that of oil or nearly 600°, thereby heightening the color and communicating an empyreumatic taste and odour. The oil is then filtered through blanket, flannel, or American drill, and put into cans for exportation. It is usually of a light straw colour, sometimes approaching to a greenish tinge. The cleaned seeds yield from 47 to 50 per cent of oil worth in England from 4*d.* to 5*d.* per lb. The following i the result of experiments made at Madras and Calcutta to ascertain the per-centage of oil in the Castor seed. (January 27th, 1853.)

Calcutta.—1400 lbs of seed yield kernels and raw oil as follows :—

	Kernels.	Oil.
1st Sort	632lbs.	324lbs.
2nd Sort	184lbs.	87½lbs.
3rd Sort	164lbs.	76½lbs.

Making a total of 980lbs. of kernels and 488lbs. of raw oil from 1,400lbs. of seed.

Madras.—1400 lbs. of seed yield raw oil as follows:

1st Sort	348 lbs.	of oil.
2nd Sort	88 lbs.	do.
3rd Sort	74 lbs.	do.

Making a total of 480 lbs. of oil from 1400 lbs. of seed.

The Cost of the Madras oil is as follows:

	Rs.		
1400 lbs. of seed at Rs. 3 3 per bag of 164 lbs.	27	3	4
Iusking and selecting kernels and cooly hire	3	11	9
rushing, moulding, pressing and boiling	2	7	1
iltering and sundries	2	8	0
verseer's pay, Godown Rent, &c. &c.	1	6	2
300 empty Quart bottles, corks &c.	34	4	8
leaning and Packing charges	4	8	0
	Rs. 76	1	0

Or an average of Annas $4\frac{17}{300}$ per quart of irst, Second and Third sort oil=4d per. lb.

Uses.—This oil is chiefly used as a mild Pur-ative. Soap of good quality may be made of it, ut the cost and disagreeable smell which it ommunicates, preclude its general use.

Exports.—Average for the last 4 years 1849-50 o 1852-53 11,325 galls. per annum.

At the Madras Exhibition of 1851, the sam-les of this oil exhibited by Mr. Gay, ladras, Mr. Kohlhoff, Tanjore, and Monsieur odefroy of Pondicherry, were particularly fine. Ir. Gay's specimen was the clearest, and most mpid, and devoid of any offensive smell. These nalities however do not arise from any superi-rity of the seed, or care in extraction, but from epeated decolorization with animal charcoal, hich in the opinion of many eminent Medical ien, considerably detracts from its strength and fficacy. Appavoo Pillay of Tinnevelly, the Nel-ore Local Committee, and Lieut Hawkes also ex-ibited excellent specimens. When manufactur-d in the ordinary Native mill, this oil is some-mes used by the richer classes in Lamps.

Castor oil (*extracted hot.*) This differs from ie preceding only in the mode of preparation—he seeds are boiled for two hours in water, ried for three days in the sun, freed from the hells, pounded and then boiled in fresh water, ntil the whole of the oil has risen to the surface. ive seers of the seeds or $3\frac{1}{8}$lb. should by this rocess yield a quart of oil. This is the sort enerally used in medicine by native practition-rs, it is straw colored, and free from any un-leasent taste or smell.—*M. E J. R.*

(5803) *Ricinus communis.* Castor or Lamp il.; fructibus majoribus.

Vullak ennai, TAM. Ped-amidum, TEL.	Chirach-ka-tel, HIND.

This oil which is obtained from the large seeded variety of the "Ricinus communis" is sometimes drawn cold, and a straw-colored specimen scarcely distinguishable in quality from the oil of the small seeded variety was shown by Lieut. Hawkes. It is however more usually extracted by heat, and forms the common "Lamp oil" of the Bazar.

Mode of preparation—The seeds having been partially roasted over a charcoal fire, both to coagulate the albumen and to liquify the oil, are then pounded and boiled in water until the oil rises to the surface. The roasting process, however gives it a deeper red colour and an empyreumatic odour.

Price.—The price of this oil varies in different parts of the country from Rs. 1 10 0 to Rs. 3 13 6 per maund of 25lbs. The average of nineteen large stations, in all parts of the Madras Presidency for the Quarter ending 31st October 1854, was Rs. 2 8 6 per maund.

Uses.—Chiefly for lamps.

Exports.—Average of the last six years. Galls. 27,561 per annum.—*M. E. J. R.* See CASTOR OIL.

(5804) *Castor Oil.* Wild. (A new species) from Canara. Is burnt in lamps.

(5805) *Sapindus emarginatus.* Soapnut oil.

Poovandie eottay or Poon-gum-kai yennai, TAM.	Koocoodie noona, TEL. Reethay ka tael, HIND.

This semi-solid oil is used medicinally by the natives, and is extracted from the kernel of the Soap-nut. Its cost prevents its general use.—*M. E. J. R.*

(5806) *Sarcostigma Kleinii.* Poovana Oil. Was exhibited by the Tinnevelly and Travancore Local Committees, and by the Rev. E. Johnston, Cottayam, and is reported to be useful in Rheumatism.—*M. E. J. R.* The Revd. E. Jonstone of Cottayam forwarded a specimen of the oil of *Sarcostigma Kleinii.* This substance has been long known under the name of Poovana and Poovengah, but the exhibitor was the first to ascertain its correct Botanical name. This medicinal oil is used largely on the Western Coast, and seems especially to merit further investigation.—*M. E. J. R.*

(5807) *Semecarpus anacardium.* Marking nut Oil.

Shayng cotty yennai, TAM. Nellajie noona, TEL.	Bhillawan ka tael, HIND.

The acrid and vesicating oil which is found between the two laminæ of the pericarp of the marking nut is collected and used as a preventive against the attacks of white ants, and by native practitioners in rheumatic and leprous affections. By boiling the whole nut not divested of its pericarp, an oil is also obtained which acts as a blister. The preparation or collection either of the oil or acrid juice is liable to cause much irritation and inflammation of the hands, face, &c, of those engaged in the work.—*M. E. J. R.*

(5808) *Sesamum Orientale.* Gingeley or Sesamum Oil (black seeded variety.)

Nool ennai, Tam. Mundie noonay, Tel.	Meetha Till ka tael, Hind.

This oil which is perhaps consumed to a greater extent than any other by the Natives of India, is, moreover, second only to cocoanut oil in its importance as an article of commerce. It is extensively cultivated throughout the whole of the Madras Presidency, and has been exported as follows.

Gingeley Seed.

Years 1847-48	Years 1848-49.
Qr. 17,513....Rs. 1,60,134	Qr. 8,594 ... Rs. 1,02,726
Years 1849-50.	Years 1850 51.
Cwt. 1,44,125 Rs. 299,412	Cwt. 2,27,779 Rs. 4,37,185
Years 1851-52.	Years 1852 53
Cwt. 1,09,414 Rs. 302,559	Cwt. 2,51,613 Rs. 5,31,664

Gingeley Oil.

Years 1847-48.	Years 1848 49.
Gl. 19 520......Rs. 14,766	Gl. 14,686......Rs. 11 535
Years 1849-50.	Years 1850-51.
Gl. 52,721......Rs. 36,294	Gl 77,262.....Rs. 48,605
Years 1851-52.	Years 1852-53.
Gl. 46,196,.....Rs. 26,722	Gl 72,607......Rs. 43,608

Of the gingeley seed exported in 1852-53 the United Kingdom received cwt. 12-713—Ceylon, cwt. 590—France. cwt. 2,87,225—Pegue, cwt. 741—Bombay, cwt. 113—Malacca, cwt. 33 and Travancore, cwt. 148. Of the quantity of oil (72,607 gals.) exported in the same year—gals. 42,043 were shipped to the United Kingdom—gals. 2,968 to Ceylon—gals. 4,232 to Mauritius And Bourbon—gals. 19,698 to Pegue—gals. 46 to Bengal—gals. 27 to the French (Indian) ports, and gals. 3,593 to Malacca.

Mode of preparation.—The great disparity of color observed in the specimens of this oil is to be attributed to the mode of preparation. The method sometimes adopted is that of throwing the fresh seeds, without any cleansing process, into the common mill, and expressing in the usual way. The oil thus becomes mixed with a large portion of the coloring matter of the epidermis of the seed, and is neither so pleasant to the eye, nor so agreeable to the taste, as that obtained by first repeatedly washing the seeds in cold water, or by boiling them, for a short time, until the whole of the reddish brown coloring matter is removed, and the seeds have become perfectly white. They are then dried in the sun, and the oil expressed as usual. This process yields 40 to 44 per cent. of a very pale straw colored sweet smelling oil, an excellent substitute for olive oil.

Uses.—In India, it is chiefly used in cookery, in anointing the person, for making soap, and for burning in lamps. In England, it is chiefly used for the manufacture of soap, and for burning in Table-lamps, for which it is better suited than cocoanut oil, owing to the lower temperature at which the latter congeals.

Price.—Value in England (January 1855) £47. 10 per ton. In different parts of the Madras Presidency the price of this oil varies from Rs. 1 5 0 to Rs. 6 0 0 per maund of 25lbs. In S. Arcot it is procurable at Rs. 27 12 5 per candy. The prices per maund of this oil, at the undermentioned stations, for the quarter ending 31st October 1854, were as follow.

	RS.	A.	P.		RS.	A.	P.
Arcot, ...	3	8	0	Madura,......	5	8	3
Bangalore,. ..	3	7	3	Mangalore,. ..	4	1	8
Bellary,... ...	3	2	0	Nagpore, ...	1	12	0
Berhampore,	2	8	0	Palamcotta,...	4	12	0
Cannanore,. ..	6	0	0	Paulghaut, ...	3	7	0
Cuddapah, ...	2	13	0	Samulcotta,..	2	10	8
Jaulnah,......	2	6	0	Secunderabad	2	3	11
Jubbulpore, ..	1	5	0	Trichinopoly,	4	1	8
Madras,... ...	3	14	0	Vellore,.	3	14	0
Masulipatam,	3	0	0	Vizagapatam,	3	2	0

Excellent specimens of this oil were exhibited by the Cochin, Tinnevelly, Rajahmundry, Tanjore, Nellore and Canara Local Committees, by Mr. Kohlhoff of Tanjore, and Lieut. Hawkes.—*M. E. J. R.*

Second sort Gingeley Oil, erroneously called "Rape," (Kharasanee yelloo), red seeded variety. This oil is expressed from a variety of sesamum and differs but little from the one abovementioned. In Tanjore, it is procurable at Rupees 3-0-0 per maund.

The following particulars concerning the two varieties of plant, yielding this important oil have been furnished by F. Copleston, Esq., Rajahmundry.

Two varieties of Sesamum are cultivated for the sake of the oil.

The gingeley seed par excellence is the produce of the plant, which is sown in the month of March, after the rice crop, and is irrigated twice, once at sowing, and once afterwards. The seed which is *black*, and is called 1st sort gingeley, from the fact of its yielding the largest per centage of oil, ripens in May, and sells at the rate of Rs. 60 per candy of 500 lbs. The oil obtained from both varieties, sells at the same price, viz. Rs. 2 14 6 to Rs. 3 per maund of 25 lbs. according to quality.

Second sort gingeley is sown in June, and produces a *red* seed. The plant although a little larger resembles in most respects the former, it has however, a somewhat longer leaf, and the flower differs a shade or two in color. A candy of 50 lbs. of this seed sells at Rs. 57 8 0. The price of the oil is the same as that of gingeley. This seed has of late been exported to France, in consequence of which the present price is double what it was three years ago.—*M. E J. R.*

(5809) *Sinapis species.* Mustard Oil.

Kadaghoo yennai, Tam. | Avaloo and Sursava noona, Tel.
Raye ka tael, Hind.

Five or six species of Sinapis are cultivated in all parts of India, for the sake of the valuable oil they yield, those most frequently seen are *S. glauca, toria,* and *racemosa.* The seeds of the "sinapis alba" yields by expression 36 per cent of a bright yellow, pleasant tasted, edible oil, having a strong smell, and slight taste of mustard. The seeds of "sinapis nigra," yield only 28 per cent of an oil in all respects similar to the above. The average price of mustard seed in eighteen large stations, in all parts of the Madras Presidency, for the Quarter ending 31st October 1854 was Rs. 1-2-8 per maund of 25 lbs., the maximum being Rs. 1-11-6 at Cannanore and the minimum As. 10-5 at Nagpore. In Vizagapatam it costs Rs. 208 per Sicca garce. The oil is not exported, but the seeds have been shipped as follows :

In the years	1847-48.....	Cwt.	5,828
,,	1848-49......	,,	6,767
,,	1849-50......	,,	9,435
,,	1850-51.......	,,	9,909
,,	1851-52......	,,	3,636
,,	1852-53......	,,	16,075

Uses.—This valuable oil, although seldom sold in the Market, being made when required, is used in most parts of India in cookery, and is considered superior to all other oils for anointing the body, which it is supposed to invigorate. In medicine, it is sometimes given internally, but is more frequently applied as a rubefacient. Lieut. Hawkes, exhibited a complete and interesting series of oils and oil cake (common mustard) obtained from four different sorts of inapis.—*M. E. J. R.*

(5810) *Sterculia Fœtida.* Fetid Sterculia Oil.

Coodira pusjun-yennai, Tam.

This semi-solid oil obtained by expression rom the seeds of a large Jungle tree, appears to ontain a large per centage of Stearine, but it is oubtful if it can be obtained in large quantities, ; was sent to the Great Exhibition of 1851 from Bombay.—*M. E. J. R.*

(5811) *Strychnos nux vomica.* Nux vomica il.

loo yettie cottay yennai, Tam. | Carun jooty, Can.

An empyreumatic oil prepared from the fresh ut, is used medicinally by Native Practitioners. t was exhibited by the Travancore Local Comittee under the name of Carunjooty oil.—*M. . J. R.*

(5812) *Terminalia Bellerica.* Belleric Myrobalan Oil.

Tanikai yennai, Tam.

A medicinal oil obtainable in small quantities from the kernel of the Belleric Myrobalan, the use of this drupe as a tanning material is well known.

(5813) *Terminalia Catappa.* Wild Almond Oil. A specimen of oil said to be obtained from the fruit of this tree was exhibited in the "Madras Tariff," and a sample labelled "Almond oil" from Tanjore was the product of this species of Terminalia.—*M. E. J. R.*

(5814) *Terminalia Chebula. Chebulic Myrobolan.* A medicinal oil is procurable in very small quantities from the kernel.

(5815) *Thespesia populnea.* Portia nut oil.

Poorasun yennai, Tam. | Paris pippul, Hind.

This deep red colored and somewhat thick oil is obtained from the seeds of the portia tree, which grows in great abundance in the vicinity of Madras, and other parts of the Presidency. It is extensively planted as an avenue tree, for which its quick-growth and the beauty of its flowers render it a favorite. The wood is capable of being worked when fresh cut and is used for boat building and cabinet work. The juice of the tree is used on the western coast, as a remedy for various cutaneous affections, and the oil which is yet unknown to the natives, might probably be of use in similar cases. Its expense precludes its use otherwise than medicinally.—*M. E. J. R.*

(5816) *Thevetia Neriifolia.* The "Exile" Oil. The kernels of the seeds of this common shrub yield by expression a large per centage of a clear bright yellow colored oil, the qualities of which have not as yet been determined.

(5817) *Thoronogullo Oil.* Pongamia glabra? from Canara used for cutaneous diseases. An empyreumatic medicinal substance called *Tuntapoo oil* (*cassia tora?*) is contributed by the Masulipatam Local Committee.

(5818) *Vateria Indica.* Piney Tallow or Doopada Oil.

Piney Yennai, Tam.

This most valuable tree, which, besides the product under consideration, yields a resin nearly equal to copal, and furnishes an excellent building wood, grows plentifully in the jungles of the Western Coast. The oil which is perfectly solid even in hot climates, is prepared by cleaning the seeds, then roasting and grinding them into a mass. To 5 seers of seed, add 12 seers of water, and boil until the oil rises to the surface. Remove the oil, stir the contents of the vessel, and allow it to stand until the following day, when more oil will be observed on the surface, which may be collected and the process repeated. The oil is principally used for lamps, but is very suitable for soaps and candle making.—*M. E. J. R.*

(5819) *Wood Oils.* This class of oils is obtained for the most part from the Burmese coast and the Straits. They are usually procured by tapping certain trees of the order Dipterocarpeæ, and applying heat to the cavity. The oil which flows from the wound, is a mixture of a balsam and volatile oil, and when applied as a varnish to wood or other substance the oil evaporating deposits a hard and durable coat of resin. They are chiefly used as natural varnishes, either alone or in combination with colored pigments, also as a substitute for Tar in paying the seams of shipping, and for preserving timber from the attacks of white ants They are said also to be useful as an ingredient in Lithographic inks. Owing to the distance from which they are brought, and the imperfect knowledge we yet possess of the countries whence they are imported, the names of the trees from which these valuable substances are derived, are involved in some degree of obscurity. The oil, therefore generally receives the names of the localities from which they are imported. Some of them differ considerably in colour and consistence, but they all possess the same balsamic odour, and are derived from various trees of the noble family of Dipterocarpeæ. In this section were remarked three good samples of good oil from Canara. Also a very interesting series of ten oils from various parts of the Madras Presidency and Burmah. Lieut Evans 51st Regt. N. I., in addition to other contributions, exhibits a bottle of wood oil from Malacca in its natural state as procured from the tree. The mode of extraction is as follows. " About the end of the dry season, that is in March or April, several deep incisions are made with an axe into the heart of the wood, and a good sized piece scooped out ; into these holes fire is placed, and kept burning until the oil begins to run, when it is received into a bamboo, and allowed to run slowly drop by drop."

(5820) *Teak Wood Oil.* An opaque dull ash colored oil under this name, is procurable in most of the large bazars of India ; when allowed to rest for some time, it separates into two layers, or an upper dark colored clear stratum and a lower and more solid deposit. Its chief use is for applying to wood work of all sorts, either alone as a natural varnish, or in combination with certain resins.

(5821) *Wood Oil from Pegu.* It is much to be regretted that the Botanical names of the trees, yielding this and the following wood oils cannot with any certainty be ascertained. The oil which is generally known by this name is a very clear and liquid substance forming a natural varnish when applied to wood or other substance.

(5822) *Deodar or Shemanatahu Oil.* Erythroxylon areolatum. An empyreumatic medicinal oil.

(5823) *Wood Oil from Chittagong.* This substance much resembles the " The Teak Wood oil" and the " Wood oil from Pegu," above mentioned. It is less liquid than the latter, but is used for the same purpose ; procurable in all large bazars.

(5824) *Wood Oil from Moulmein.*

(5825) *Wood Oil from Rangoon.* This appears to differ very considerably from any other specimen of "wood oil" in the Exhibition, it is quite white and almost solid—but has the usual resinous shell of this class of oils.

(5826) *Wood Oil* from Singapore.

(5827) *Wood Oil* from China.—Although scarcely coming within the limits of this report, this valuable product merits notice as being one of the substances of which the well-known and much prized China lacquer is mode. It is used in Singapore for painting the beams and woodwork of Native houses, and may also be mixed with paint when not exposed to the sun.

(5828) *Sissoo-Wood Oil.*—Dalbergia sissoo. An empyreumatic medicinal product.

(5829) *Wood Oil* from Tinnevelly. An empyreumatic product similar to tar, chiefly used medicinally by Native Practitioners.

(5830) *Camphor Wood Oil. Dryobalanop Camphora.*—The last of this series belongs to the class of " Volatile oils," but may be here noticed. The specimen exhibited by Lieut. Hawkes was forwarded to him from Singapore through Lieut. Heath of the 38th Regiment N. I., and another excellent specimen which is exhibited by Second Dresser Pulneandy was brought by him from Labuan. It is used largely in Singapore as a substitute for turpentine, and sells at from 15 to 20 cent. a bottle. The Jury consider Lieut. Heath and 2d Dresser Pulneandy deserving of Honorable Mention.

(5831) *Wood Oil*, as obtained from the tree without any preparation. This very interesting specimen which was before mentioned as being contributed by Lieutenant E. J. M. Evans, 51st Regt. N. I., by whom it was obtained from Malacca, is obtained from a large tree of the Dipteraceous family which is very common in the dense jungles of the Malayan Peninsula, and grows to a great height When not topped too soon, the base of th trunk is often of immense girth—the wood i reddish brown and has a smell not unlike that o English fir, the bark is smooth, the leaves alter nate, pinnate and exstipulate, fruit a one seede drupe, seed angular and anatropal. The oi when permitted to remain at rest divides itsel into two layers, the upper consisting of a clea chesnut colored liquid balsam and the lowe being in appearance like flakes of granulate sugar and consisting probably of the surplu resin deposited by the action of the atmospher The Jury considered the Exhibitor deserving Honorable Mention.

(5832) *Mineral Oils.* Specimens of *Petroleum* are exhibited by the Madras Tariff and Lieut. Hawkes, the produce of our Burmese Possessions. Its uses are well known. The Wound tree oil, or *Gayapanoona* of Rajahmundry although locally known for sometime, is now prominently brought to notice.

(5833) *Wrightia Antidysenterica.* Rosebay Oil.

Vaipallay yennai, TAM.

A medicinal oil—little known. A thick, scarlet colored, medicinal oil partaking doubtless of the properties of the seed.—*M. E. J. R.*

(5834) OLAY.

Olay, TAM.	Puttay, HIND.
Tatakoo, TEL.	

Are the three vernacular names by which the people designate the leaves, when prepared for being written upon, of the Palmyra (Borassus *flabelliformis*), of the cocoanut tree, and those of the Taliput palm (corypha umbraculifera). The oldest Hindoo author who alludes to writing on the Olay is Panniny rishee, who lived above 4160 years ago, and resided at Arittuwaium, near the source of the Ganges. Pliny says expressly (lib : xiii. cap : 2) that the most ancient way of writing was upon the leaves of Palms, from which, it is believed that the leaf *(folium)* of a book came to be synonymous with that of a plant. They are written upon with the style, which is pointed with steel and its handle sometimes highly ornamented. During the operation of writing, the leaf is supported by the left hand, and the letters are cut or scratched upon its surface with the style, which is kept always in the same position and the leaf is moved to the left hand side by means of the thumb. To render the characters more legible, he engraved lines are occasionally filled by smearing the leaves with fresh cow-dung, which is tinged black by rubbing the lines over with cocoanut oil, or a mixture of oil and charcoal powder, nd for the same object, in Ceylon, an oil, called Doomale is sometimes rubbed on the letters with burned rag. All the sacred books of the Hindoos, Burmese, Cingalese &c. are still made of these olay, some of them being highly ornamented. All ccounts in the revenue department, all grants of nd, leases, and all the accounts in shops are till kept on these leaves, and they are likewise ent as letters. Books are never much beyond wo feet in length and two inches in breadth, they re said to last from one to four or five hundred ears.—*Seeman.*

(5835) OLDENLANDIA BIFLORA. Two LOWERED INDIAN MADDER.

Purputee, Papra, HIND.

Appears in moist ground in the rainy season. --*Genl. Med. Top. p.* 180. *Oldenlandia biflora* very common in Bengal, and called in Bengali *Khet-papura*; other species also occur and are called *Gunda badulee,* and *Poonkha.—O'Shaughnessy, p.* 400.

(5836) OLDENLANDIA UMBELLATA. CHAY ROOT PLANT. Lin.

Emboorel also Ramiseram vayr, TAM.

A native of Java, Coromandel, and Mexico; root long and orange-coloured, employed in Coromandel to dye an excellent red on cotton cloth; considered by the native doctors to be expectorant.—*O'Shaughnessy, p.* 400. The small, white, numerous leaves of this low growing plant, are slightly bitter, and unpleasant to the taste; the Native Doctors consider them as expectorant and prescribe them, accordingly in complaints of the Chest. When dried and pounded, they are also mixed with flour, and made into cakes, which are eaten by such as suffer from consumptive or Asthmatic affections.—*Ains. Met. Med. page* 79. See CHAY ROOT.

(5837) OLEA a genus of plants the type of the natural order Oleaceæ. It has a 4-cleft corolla a berry with two brittle 1-seeded cells one of them generally abortive. The leaves undivided. Flowers greenish clustered, axillary. Olea Europea has lanceolate quite entire 2-coloured leaves with axillary racemes. It grows wild in rocky places in Italy. It differs from most trees except the sweet Bay (Laurus nobilis) some species of Cornus, and a very few others in yielding a fixed oil from the pericarp; the seed being the source of fixed oil, in most plants. The oil which is expressed from the ripe fruit immediately after being collected is most esteemed, and called Virgin oil Oleum Provinciale. That which is most highly prized comes from Nice and Genoa. When the oil is extracted by a stronger pressure or by the aid of heat or after the olives having been collected into heaps have remained till a kind of fermentation has occurred, it is the common olive oil, the properties of which vary in proportion as the fermentation has been of long or short duration. An oil of still inferior quality is obtained, when the husk of the olive after the former treatment is boiled in water. This kind is employed solely for the preparation of soap. Virgin Oil is of a very pale-yellow or yellowish-green colour more limpid when pure than any other fixed oil, inodorous, when fresh; but emitting a very peculiar odour when old, taste purely oily but by age becoming slightly rancid. Common olive oil is of a deep greenish or brownish yellow colour, and an odour and taste more or less subrancid. Its specific gravity is greater than the oth r. The unripe fruit of the olive is preserved in brine, and eaten frequently at desert. The olive flourishes only in warm and comparatively dry parts of the world, as the south of France and Spain, in Italy, Sicily, Syria, and the north of Africa. Humboldt has stated that " the olive flourishes between 36° and 44° N. lat ; wherever the mean annual temperature is from 62. 6 to 50°, where the mean temperature of the coldest month is not below from 41° to 42°8, and that of the whole summer from 71-6° to 73°4." Great cold is injurious to it, as that of 1709 was to the olive trees of France ; and as M. Bove states that the olive thrives in Egypt, and Delta that it contributes to the riches of the Fayoum, which is nearly in the latitude of Cairo, it is evident that it is capable of bearing a greater degree of heat, as is probable indeed from its being a native of Asia, having been cultivated in early times in Syria and Palestine by the ancient Hebrews, and known to them by the name of Zait, and to the Arabs by that of Zaitoon. It is said to have been introduced by the Phocæans into Marseille.—*Eng. Cyc.* Dr. Wight gives Olea clavata, 736 ; glandulifera, 1238 ; linocieroides, 1241 ; *paniculata*, 735 ; polygama, 1239-42 ; robusta, 1242 ; Roxburghii, 735.

(5838) OLEA DIOICA, OLEACEÆ.

Koly marum, TAM.

According to Roxburgh the timber of this tree is reckoned excellent and is put to many uses by the inhabitants of Silhet ; a specimen of the wood did not accompany the flowering one, so that he was unable to offer any opinion on it.—*Wight.*

(5839) OLEA FRAGRANS, OR KWEI HWA, is largely cultivated *in* China, for scenting tea.—*William's Middle Kingdom, p.* 288. *Olea fragrans*, the Qui Wha of the Chinese is by them planted in different parts of their gardens.—*Fortune's Tea Districts, p.* 17. Along the banks of a ditch, through which the tide ebbs and flows, there is a row of the *olea fragrans*. This is the famous kwei-wha of the Chinese, and one of their most favourite flowers. It forms a good-sized bush, about as large as a lilac, and flowers in the autumn. There are three or four varieties, the main difference between them consisting in the colour of their blossoms. Those kinds which produce brownish-yellow flowers are the finest and are most highly esteemed by the natives. The bushes are seen growing near all the villages in the north-eastern provinces of the empire, and are plentiful in gardens and nurseries. When they are in flower in the autumnal months, the air in their vicinity is literally loaded with the most delicious perfume. One tree is enough to scent a whole garden. The flowers of the kwei-wha are a source of great profit to the Chinese cottages, as well as to the nurserymen, who produce them in large quantities for the market. There is a great demand for them in all the large towns. Ladies are fond of wearing wreaths of them in their hair ; they are also dried and placed in ornamental jars, in the same way as we do rose-leaves in Europe, and they are used largely for mixing with the finer kind of tea, in order to give it an agreeable perfume. The fragrant olive, moutan, sacred bamboo (*Nandina domestica.*)—*Fortunes' Tea Districts, p.* 79.

(5840) OLEA EUROPEA. OLIVE OIL. *The Olive-tree.* There are several varieties of this plant, two of which have been long distinguished —the wild and the cultivated. The former is an evergreen shrub or low tree, with spiny branches and round twigs ; the latter is a taller tree, without spines, and with four-angled twigs. The fruit is a drupe about the size and colour of a damson. Its fleshy pericarp yields by expression olive oil, of which the finest comes from Provence and Florence. Spanish or Castile soap is made by mixing olive oil and soda, while soft soap is made by mixing the oil with potash. The wild olive is indigenous to Syria, Greece, and Africa, on the lower slopes of Mount Atlas. The cultivated species grows spontaneously in Syria, and is easily reared in Spain, Italy and the South of France, various parts of Australia and the Ionian Islands. Wherever it has been tried on the sea-coasts of Australia, the success has been most complete. There are several fine trees near Adelaide, some of them fourteen feet high, bearing fruit in abundance. Unfortunately no one has attempted to cultivate the plant on a large scale, but in a few years Australia ought to supply herself with olive oil. The olive tree is also grown in Hong Kong. There are five or six varieties of *O. Europæa*, or *sativa*, grown in the south of Europe, of which district they are for the most part natives. The entire exports of oliv oil from the kingdom of Naples have bee estimated at 36,333 tuns a year, which take at its mean value when exported at £6 per tun, is equivalent to the annual sum o £2,252,646. There are one or two distinc species, natives of the East Indies and th Cape of Good Hope. This genus of plants, besides their valuable products of oil and fruit, ar also much admired for the fragrance of their whit flowers. There is a yellow-blossomed variety native of China, *O. fragrans*, the Lanhoa or Kw Hwa, of the Chinese, which is used to perfum their teas. Olive oil now forms an article of export from Chili, being grown in most parts that republic, particularly in the vicinity of S Jago, where trees of three feet in diameter, an of a proportionate height, are common. The oliv was first carried from Andalusia to Peru in 156 by Antonio de Ribera, of Lima. Frezier speaks the olive being used for oil in Chili, a century a a half ago. The culture of the olive has been recommended for Florida and most of the Southe States of America. Formerly, on account of its sl growth, the olive was not considered very usefu but some years since a new variety was introduced into France, and into some parts of Spa and Portugal, which yields an abundant crop fruit the second year after planting. They a small trees or rather shrubs, about four or five feet high. The fruit is larger than the common olive, is of a fine green color when ripe, and contains a great deal of oil. The advantages accruing from this new mode of cultivating the olive tree, are beyond all calculation. By the old method an olive tree does not attain its full growth, and consequently does not yield any considerable crop under thirty years; whereas the new system of cultivating dwarf trees, especially from cuttings, affords very abundant crops in two or three. An acre of land can easily grow 2,500 trees of the new variety, and the gathering of the fruit is easy, as it can be done by small children. At Beaufort, South Carolina, the olive is cultivated from plants which were obtained in the neighbourhood of Florence, Italy. A gentleman in Mississippi is stated, by an American agricultural journal, to have olive trees growing, which at five years from the cutting bore fruit, and were as large at that age as they usually are in Europe at eight years old. The olive then, it is added, will yield a fair crop for oil at four years from the nursery, and in eight years a full crop, or as much as in Europe at from fifteen to twenty years of age. The lands and climate there are stated to be as well adapted to the successful cultivation of the olive for oil, pickles, &c., as any part of Europe. Some hundreds of the trees are grown in South Carolina, and the owner expressed his conviction that this product would succeed well on the sea-coast of Carolina and Georgia. The frosts, though severe, did not destroy or injure them, and n one case, when the plant was supposed o be dead, and corn was planted in its stead, ts roots sent out shoots. It is well known o be a tree of great longevity, even reaching to 1,000 or 1,200 years; so that, when once established it will produce crops for a great while afterwards. The expense of extracting the oil s also stated to be but trifling. The olive is of low growth; trees 80 years of age measure only from 27 to 30 inches in circumference at he lower part of their trunks. An olive tree is mentioned by M. Decandolle as measuring above 3 feet in circumference, which, judging from the bove inferences, may be safely estimated at 700 ears old. Two other colossal olives are recordd, one at Hieres, measuring in circumference 36 eet, and one near Genoa, measuring 38 feet 2 inhes. The produce in fruit and oil is regulated y the age of the trees, which are frequently little ortunes to their owners. One at Villefranche prouces on an average, in good seasons, from 200 o 230 pounds of oil. The tree at Hieres, bove mentioned, produces about 55 imperial allons. The olive is found everywhere along the coast of Morocco, but particularly to the south. The trees are planted in rows, which form alleys, he more agreeable because the trees are large, round, and high in proportion. They take care to water them, the better to preserve the fruit. Oil of olives might be here plentifully extracted were taxation fixed and moderate; but such has been the variation it has undergone, that the culture of olives is so neglected as scarcely to produce oil sufficient for domestic consumption. Olive oil might form one of the most valuable articles of export from Morocco. It is strong, dark, and fit only for manufacturing purposes. This is, perhaps, not so much the fault of the olive as of the methods by which it is prepared. No care is taken in collecting the olives.—*Simmonds.* Dr. Royle tells us that the Olive tree, ελαια of the Greeks, *Zait* of the Bible, and *Zaitoon* of the Arabs, is one of the most celebrated and useful of trees. The olive tree is usually small, evergreen, but of a dull aspect, wood hard. Leaves with short petioles, ovate-lanceolate or lanceolate, mucronate of a greyish green colour above, hoary beneath. Flowers white, in short axillary clusters. Cal. (2) small 4-toothed. Corol with short tube and 5-cleft limb (1). Stamens 2, a little exserted. Style short. Stigma (2) bifid segments emarginate. Ovary 2-celled, 2-seeded. Drupe (3) about the size of a damson, purple coloured, containing only one sharp-pointed nut.—A native probably of Asia, early cultivated in Syria and Greece. The varieties of the olive are numerous. The var. *longifolia* is chiefly cultivated in the S. of France and Italy, and the var. *latifolia* in Spain.—Esenb. and Eberm.212. St. and Ch.15. The leaves and bark of the Olive tree have been employed; also a peculiar resinous exudation, called *Olivile* and *Olive gum.* And the bark as a substitute for Cinchona. The fruit of the Olive though esteemed even in its unripe state, as an article of the dessert, having been first steeped in an alkaline ley, and then preserved in salt and water, is chiefly valued on account of the bland fixed oil which is stored up in its outer fleshy part. This is obtained by at once bruising the nearly ripe fruit with moderate pressure in a mill (*Virgin Oil*), or by the aid of boiling water and greater pressure, or when fermentation has taken place in the olives collected in heaps, *ordinary* and inferior oils are thus obtained, the worst being employed only as lamp-oils or in the manufacture of Soap. The finest oils are produced near Aix, Montpellier, Nice, Genoa, Lucca, and Florence. It is also largely produced in the kingdom of Naples, and exported from Gallipoli, on the East coast of the Gulf of Taronta, whence it is commonly called Gallipoli Oil. Olive oil may be taken as the type of the *Fatty* or *Fixed*, called also *Expressed Oils*. It is of a pale yellow, or of a light yellowish-green colour, without smell when fresh, having a bland, somewhat sweetish, fatty taste. It is very limpid. Sp. Gr. 0·910 at 77°, insoluble in water, is readily dissolved by volatile oils, and by twice its bulk of Ether, but requires much more Alcohol. Exposed to the air it absorbs Oxygen and becomes rancid, but not drying like Linseed oil, is preferred for machinery. At 38° F. it begins to congeal, and is readily separated at 20° into two distinct bodies, of which one is fluid, called Elaine, or Oleine 72, and the other 28 per cent. solid, named Margarine from its pearly aspect. This is often deposited in jars and casks of the oil. Hyponitrous acid converts Olive Oil into a concrete mass from producing the oleaginous principle Elaidine, mentioned at p. 203. If this like other oils is heated with Alkaline solutions, or with the Oxide of Lead, great changes take place, as exemplified in the making of Soap, and of Lead Plaster, p. 161.

Tests.—Olive Oil is apt to be adulterated with poppy and other oils; these are distinguished by not congealing at the same temperature as olive oil, also by retaining air when shaken up, more readily than pure olive oil. The E. P. directs that "when carefully mixed with a twelfth of its volume of solution of Nitrate of Mercury, prepared as for the Unguentum Citrinum it becomes in three or four hours like a firm fat, without any separation of liquid oil" If 5 per cent. of any other oil be present, the consolidation is slower and less firm, but if there be 12 per cent, the foreign oil floats on the surface for several days. M. Gobley has invented an Elaiometer. (P. J. iii. 293.)

Action. Uses. Nutrient, Emollient, internally in irritant poisoning, externally relaxing, much employed for frictions and for embrocations, and to give consistence to Cerates, Ointments and Plasters: good application to the hair from not drying readily. In doses of ℥j. laxative added to enemata for its emollient effect, or to dislodge ascarides.—*Royle, p.* 476. There are several varieties of this plant, two of which have been long distinguished—the wild and the cultivated. The former is an evergreen shrub or low tree, with spiny branches and round twigs; the latter is a taller tree, without spines, and with four-angled twigs.—*Simmonds' Commercial Product, p.* 527.

(5841) OLEACEÆ, *Oliveworts*, a natural order of monopetalous Exogenous Plants, with a superior 2-celled ovary, a subvalvate corolla, two stamens, and a fruit with pendulous albuminous seeds. In the artificial collocations of natural orders to be found in books, these plants are usually stationed next *Jasminaceæ*, with which they have been even combined. It is however probable that they have really as much affinity with some of the monopetalous dicarpous orders. Lindley, in his 'Vegetable Kingdom,' arranges them in the Solanal Alliance, and gives their further affinities as with *Aceraceæ*, *Jasminaceæ*, and *Solanaceæ*. The species of the order best known in this country are, the Olive, or *Olea Europæa*; the Lilac, or *Syringa vulgaris*; the Evergreen Phillyrea of many forms; the privet, or *Ligustrum*; and the Fringe-Tree, or *Chionanthus*; all corresponding in habit and in sensible properties, which latter are very generally bitter and febrifugal. The bark of the Olive has been extensively used by the French instead of *Cinchona*, and the young fruits of the common Lilac form an infusion scarcely inferior to gentian. The most anomalous genus of the order is the Ash, which, in its most genuine form, has no petals, and in the division called *Ornus* has the petals present, but separate to the base. It is however, in all essential circumstances, the same in structure as the more regular genera, and its relation to the order has been ingeniously proved by the fact that the Olive and the Lilac will both live when grafted upon it. It is from the *Ornus*, or Flowering-Ash, that the bitter-sweet purgative called manna is secreted. The order has 24 genera and 130 species.—*Eng. Cyc.*

(5842) OLEASTER PLUM. ELÆAGNUS CONFERTA. This sour red plum makes very good tarts and jellies, and abounds in some parts of the Tenasserim jungle.—*Mason*.

(5843) OLIBANUM: OLIBANUM INDICUM —Gunda barosa—oleo-resinous product of Boswellia thurifera.—*Ben Phar.* INCENSE, FRANKINCENSE, THUS.

Looban, ARAB.
Gunda barosa, BENG.
Avul Coondur, DUK.
Encens, FR.
Incense, Koondur zuchir GUZ. HIND.
Incenso Olibano, IT.
Looban MAL.
Luban, PERS.
Labuniya, SYR.
Paranghi Sambrani, TAM
Weirauch, GER.

Good Olibanum is, as met with in Bombay, in semi-transparent tears, of a light yellow colou sometimes inclining to white; brittle, and adhesive when warm; when burnt the odour is ver agreeable; its taste is bitterish, and somewh pungent and aromatic. Olibanum has bee celebrated from the earliest ages, and used i nearly all the religious ceremonies of antiquit It is chiefly employed in fumigations, and in th ceremonies of the Greek and Catholic churche It is imported into Bombay from the Persia Gulf; the superior or garbled qualities are r exported to England and France, and the inferio or refuse kinds to China.—*Faulkner*. The sour of this article is the Boswellia serrata or I Thurifera.

(5844) *Boswellia*, a genus of balsamic plants b longing to the natural order Amyridaceæ. One the species is believed by Colebrook to be th Λίβανος of Theophrastus, and the *Thurea virga* the Romans. ('Asiatic Researches,' vol. ix.) *En Cyc. page* 582. It appears that the gum-resin ca ed olibanum is the frankincense that was used the ancients in their religious ceremonies. Linnæ was of opinion that it was yielded by the Lyci juniper; but that plant is a native of the south France as well as of the Levant, and the botanis of that country deny that any such substance produced by their juniper. The Greeks obtain their frankincense from Arabia. The Arabians call olibanum both Luban and Cunder; but as benzoin is most used at the present day for eligious purposes, the Mohammedan writers of India on Materia Medica apply only the erm Cundur to olibanum. This Cundur ias been ascertained by Messrs. Colebrook, Hunter, and Roxburgh to be yielded by *Boswellia thurifera* or *Boswellia serrata*. It is large timber-tree found in the mountainous arts of India, yielding a most fragrant resin rom wounds made in the bark. Its leaves are innate, and consist of about ten pairs of hairy errated oblong leaflets, each of which is from n inch to an inch and a half in length. The lowers are pale pink, small, and numerous. The calyx is 5-lobed, the corolla of 5-downy petals, the disk a fleshy crenelled cup, and the stamens 10, alternately shorter. The fruit is a 3-ided, 3-valved, 3-celled capsule, containing a ingle-winged pendulous seed in each cell. From his, Roxburgh distinguishes as a different species *Boswellia glabra*, a plant also yielding a resin hich is used for incense and as pitch in some arts of India. It differs from the last in having no hairs on its leaves, in its leaflets being ften toothless, and its flowers being panicled. substance analogous to olibanum, and used in similar way in various parts of the world, is rocured from several different trees, such as, in merica, the *Croton nitens* (Schwartz), *C. thurier* (Kunth), *C. adipatus* (Kunth) : in Columbia. *Bailleria nervifolia* (Kunth) yields the American rankincense; the *Amyris (Icica Tacamahaca,* Kunth) *ambrosiaca* (Linn), yields also the resin oumier, likewise called American frankincense. *ætia apetale* (Jacq.) also yields a substance similar to frankincense. *Olibanum* occurs in commerce of two kinds, the Arabian and East Indian. The former kind is now seldom met with, and its rigin is a subject of doubt; the latter is obtaind from the tree above described, and to it we mit our remarks. There are two varieties or egrees of fineness of it, the best called 'oliba-um electrum,' or 'in grains' sometimes called thus mannæ' or 'thus masculum' : the other is ermed 'olibanum commune,' or 'in sortis,' also emineum.' The first occurs in pieces varying om the size of a hazel-nut to that of a walnut, r larger, which are roundish or irregular in hape, of a light yellowish colour, varying to red r brown in some pieces, opaque or semi-trans-arent, the outside often covered with a white owder, and upon being pounded the whole becomes a white powder. It is very friable, and reaks with a dull, sometimes even, sometimes plintery fracture. The second sort is generally larger pieces, mostly of a dirty-gray or fawn-olour, and intermingled with pieces of wood nd other impurities.—*Engl. Cyc. p.* 583.

(5845) *Boswellia Glabra.*

Salace, Hind. | Moræda, Tam.

A small tree; leaves pinnate, deciduous; flowers terminal, small, white with a red nectary, anthers yellow; yields the gum salai.

(5846) *Boswellia Serrata*, Stach. (B. thurifera, Colebr.); Roxb. Fl. Ind. 2. p. 383.

(5847) *Boswellia Thurifera*, Colebrooke, *As. Res.* xi. 317 xi. 158. Roxb. *Fl. Ind.* 383. Pereira, *Medical Gazette*, xx. 676.

Gunda barosa, Avul
Kundoor, Vern.
Looban, Duk.

Koonder Zuchir, Arab.
Dup-salace, Hind.

A tree with leaves pinnate as the last; grows on the hills of the Deccan. It is a native of the mountainous tracts of Central India, and very common in the Shahabad country. Dr. Hooker remarks, when speaking of this plant, we continued to ascend from Belenppee in Behar to the height of 1360 feet, where I came upon a small forest of the Indian Olibanum (*Boswellia thurifera*), conspicuous from its pale bark, and spreading curved branches, leafy at their tips; its general appearance is a good deal like that of the mountain ash. The gum, celebrated throughout the East, was flowing abundantly from the trunk, very fragrant and transparent.—*Hooker Him. Jour. p.* 29. The *Salai, salace*, tree, *Boswellia thurifera*, remarks Dr. Irvine, is plentiful in the Ajmeer hills : the gunda birosa is the prepared gum resin of this tree, and is similar in appearance and qualities to Venice turpentine. It is brought from Mewar, Harowtee and the Shekhawatee hills : and is considered stimulating : an oil is distilled from it, said to cure gonorhœa. It is used also in ointments : much used in painting and by the lakheries : one maund cost twelve rupees.—*Med. Top. of Ajmeer*: From the Shahabad country, Dr. O'Shaughnessy obtained fine specimens of the resinous products there called *sale gond or sale lassa.* At Chandalgur it is termed *gunda biroza*, and in the dry state *sukha biroza.* Dr. Hamilton however thought the English Olibanum to be the produce of an Amyris, partly because he could not find that the *sale* resin was used as incense by the Hindoos. The B. glabra and B. thurifera both furnish the Male frankincense of Dioscorides. The resin olibanum occurs in reddish or pale yellow tears, oval, oblong and obtuse, sometimes in dense, opaque, brittle masses. The gunda barosa of the bazars is soft, ductile, opaque, greenish and white. The odour is balsamic and resinous, especially while the resin is burning; the flavour balsamic, and rather bitter. The powder, citron yellow. It is frequently adulterated by dammer, sandarach, and other cheaper resins; when chewed, the hard variety softens, and dissolves partially in the saliva, which it renders white and emulsive. —*O'Shaughnessy*. The ointment from this is the late Mr. Muston's boil ointment, and is a very useful application. It is an excellent substitute for the Elemi Ointment of the London Pharmacopœia.—*Beng. Phar, p.* 3838. According to Dr. Royle, the Indian is imported in chests chiefly from Bombay, also from Calcutta, but the place producing it is not well ascertained. Mr. Turnbull, of the Medical Service, many years since sent some resin of the *Salai* tree collected in the hills near Mirzapore, which in the London market was recognized as Olibanum. Mr. Colebrooke determined that *luban* or Olibanum is produced by a tree called *salai*. Dr. Royle also collected a very fragrant resin from the *saleh* tree of North-west India, which bears a very close resemblance to common Olibanum. This tree is *Boswellia glabra*, Roxb., the former is *B. thurifera* of Colebrooke, called *B. serrata* in many works; but as Messrs. Wight and Arnott say, "We dare not quote here *B. serrata*, Stack. extr. Bruc. p. 19, t. 3, the leaves being usually described as ovate, oblong, and acuminate." Both species were collected by Col. Sykes in the Deccan as the Olibanum-tree. Dr. O'Shaughnessy states that he has received fine specimens of Olibanum from the Shahabad district, where it is called *sale gond*, and at Chandalgur *gunda barosa*. This tree (Boswellia thurifera, fig. 55) grows to a large size in hilly situations, from the Coromandel coast to the central part of India it is much branched but bare of leaves in its lower parts, but these are crowded and alternate towards the ends of the branches, unequally pinnate. Leaflets oblong, obtuse, serrated, pubescent. Stipules none. Inflorescence in single axillary racemes near the ends of the branches, shorter than the leaves. Flowers on short pedicels, of a pinkish white colour. Flowers bisexual. (v. 55. 1.) Calyx small, 5-toothed. Petals 5. obovate, tapering to the base, inserted under the margin of the disk; æstivation slightly imbricate. Disk surrounding the base of the ovary, cup-shaped, fleshy, crenulated. Stamens 10, inserted under the disk. Ovary sessile, 3-celled, with 2 ovules in each, attached to the axis. Style terminated by a capitate 3-lobed stigma. Fruit capsular, 3-angled, 3-celled, 3-valved, septicidal (splitting at the angles into valves). Seeds solitary in each cell, girded by a membranous wing. Cotyledons intricately folded, multifid. Indian Olibanum, which is now the most esteemed, is in roundish or oblong tears, of a reddish or a light yellow colour, usually covered with whitish powder, from attrition of the pieces against each other, translucent within of a warm bitterish taste, and having a balsamic odour especially when warmed or burnt. Sp. Gr. 1-22. Analysed by Dr. O'Shaughnessy, a fine specimen gave of Resin 37 parts, Volatile Oil 28 parts, Gum 4, Gluten 11, in 100 parts. But the quantity of Volatile Oil is necessarily much less when it has been exposed and become dry, as seen in commerce. Bracannot obtained only 8 per cent. of Oil, of Resin 56, Gum 30, matter like Gum 5·2, loss 0·8=100.

(5848) OLIBANUM AFRICAN, AFRICANISCHEN WEIHRAUCH. GER.

Encens, FR.

Imported into Vienna and Marseilles from Suez, and obtained from Arabia and the east coast of Africa, is mentioned by Dr. Pereira as African or Arabian Olibanum, and as occurring in smaller tears than the Indian variety, yellowish or reddish and intermixed with crystals of Carbonate of Lime. One kind of African Olibanum is no doubt produced on the hills of the Somali coast westward from Cape Guardafui, and carried to the Arabian coast chiefly by native boats from Maculla. This tree partially described by Capt. Kempthorne of the Indian Navy, has been identified by Mr. Bennett of the British Museum with *Ploslea floribunda* of Endlicher, but which appears to Dr. Royle to be nothing but a species of Boswellia, which he would therefore call *B. floribunda*. The specimens are covered with little resinous exudations, as are the leaves of a plant collected in the island of Socotra by Lt. Wellsted, which also appear to be those of a Boswellia. *Action. Uses.* Stimulant. Sometimes used in chronic affections of mucous membranes, but chiefly in plasters, and as a fumigation.—*Royle, p.* 338.

(5849) OLIVES.

Zeitoon, ARAB.
Olives, FR.
Oliven, GER.
Zeitoon, GUZ. HIND.
Ulive, Olive, IT.
Olivæ, LAT.
Booa-minyak, MAL.
Zeitoon, PERS.
Azeitonus, PORT.
Accitunis, SP.

The fruit of a tree (*Olea Europea*), a native o the South of Europe, Persia, and the North o Africa, and extensively cultivated in France Spain, Italy, &c. Olives, when fresh, have harsh, and extremely bitter taste; and they ar eaten only after having been steeped for severa days in a ley of wood ashes, and then pickled i a strong solution of muriate of soda. They ar chiefly valued on account of the oil obtained fro them; and are also eaten as an article of dessert —*Faulkner*. See OLEA. The fruit is perfectly oval rounded at both ends, about one inch long smooth, shining green, its sarcocarp fleshy, succulent, covering oval, oblong, rugose, pointe nut, marked with longitudinal furrows of as colour; almond white, and compressed. Inodorous, taste rough, modified by salting.—*O'S*

(5850) OLIVE, CHINESE, the tree commonl called the Chinese olive is a species of Canarium and the fruit gets this name from the resemblance it bears to the olive of Europe; It grow along with the Chinese date, a species of (ziz phus), which produces a fruit not unlike the dat imported into England.—*Fortune's Wandering* *p.* 382.

(5851) OLIVE OIL, Lucca Oil, Salad Oil.

Huile de Olives, Fr.
Baumol, Ger.
Zeytoon-ka-teil, Guz. Hind.
Olio d Uliva. It.
Oleo-das-Azeitonas, Port
Aceite de Aceitunas, Sp.

The lightest of the fixed oils, is derived from the olive fruit. Olive oil being high priced, is frequently adulterated with cheaper kinds, sesamum oil (*Vern.* Gingelly oil) chiefly. In the countries of production, this oil is an important article of subsistence to all classes; and is also employed to burn in lamps. In Great Britain it is used in cooking and for salads, and considerable quantities are also employed in the making of fine soap, in the woollen manufactures, and in other arts. In medicine it is used as an emollient, and to form cerates and plasters. It is supposed that a portion of the large quantities of Gingelly oil exported from Bombay to France, after undergoing certain purifying processes are returned to India in the shape of olive oil.—*Faulkner.* See Olea. Olive oil is of pale yellow colour, greenish in one variety: is often adulterated with the oil of poppies. Poutet describes a test by which he states the adulteration may be detected; 8 parts of liquid nitrate of mercury when mixed with 92 parts of *pure* olive oil solidify completely in a few hours; should the oil contain even one-twentieth of the oil of poppies, a soft mass only is obtainable. These experiments are, however only available in India during the nights of the cold season. The principal use of olive oil is as an aliment; it is also consumed extensively in soaps, cerates, liniments, plasters, &c. According to the mode of expression, the quality of the oil varies considerably; *virgin oil,* the product of the perfectly recent fruit, is of greenish colour, and highly esteemed; *common olive oil* results from the expression of the fruits after they have undergone a slight fermentation. It is yellow, sweet, and well suited for culinary purposes. The oils inferior [illegible] this are consumed almost exclusively in the fabrication of soap, and are obtained by subjecting to the press a second time the crushed fruits which have already yielded the first and second qualities of oil. The finest olives and the worst oil are produced in Spain. The oil of the Sesamum orientale, of the arachis, and of the poppy, are perfect substitutes for the olive oil for medicinal and pharmaceutical uses.—*O'Shaughnessy, p.* 432,433. Vegetable oils are in most cases extracted from the seeds of plants, but in the case of the olive, the best oil is contained in the pulpy part of the fruit, and this is carefully extracted before the seeds are subjected to pressure. The olive is a tree which grows luxuriantly in Italy, whence our chief supply of he oil is obtained; but it is not indigenous to that country, having been transmitted thither from its home in the east. Asia, the birthplace of civilization, was likewise the birthplace of the olive; and in the western world the tree followed the progress of peace, of which it is considered the symbol. The olives in Syria and the Holy Land are very numerous and of great age, springing up without culture in wild luxuriance. The olive-groves of Greece are likewise famed, and some of the Greek islands export large quantities of the oil. Olive oil is also to be obtained on the African coast, and in the south of France and Spain. The olive-tree is not very much unlike the English willow, and is frequently polarded in a similar manner. The scenery in that part of the Italy which may be called "the heel of the boot," is rendered monotonous by the immense olive-groves which cover the country. Throughout the whole of the two provinces Bari and Lecce, or La Terra d' Otranto, scarcely anything else is cultivated. The most celebrated port of these provinces is Gallipoli, which gives its name to the oil brought from an extensive district. Great part of the merit of Gallipoli oil arises from the facilities which that town possesses for keeping it pure and fresh after it is brought in from the country. These will be noticed presently, but we must first describe the very simple means employed to procure the oil. Olive-trees begin to bear at two years old, but are not in full bearing until after five or six years, when they become a sure source of wealth to their owners. They are of extreme longevity, and will bear luxuriant crops when the trunk is quite hollow. A tree of this description, whose empty shell scarcely supported it against the mountain storms, is stated to have produced in one year 240 English quarts of oil. Some years ago there was an olive-tree near Nice in a decaying state, which had been the wonder of that part of the country on account of its enormous size and great age. The lowest extremity of the trunk measured 38 feet, and one of the main branches 6½ feet in circumference. As far back as 1516 this tree was distinctly recorded as the oldest in the neighbourhood. In former years it has borne upwards of three hundred-weight of oil in one season, and so late as 1818 it produced two hundred weight. A celebrated olive-tree at Pescio was said to be 700 years old. These, however, are exceptional cases, and it appears probable that the majority of trees do not continue productive much above a century, unless great attention is bestowed upon them. The ingathering of the olives is performed in different ways. Some cultivators allow the fruit to attain complete ripeness and to drop from the trees. Others consider that the fully ripe fruit produces too fat an oil, and one which is liable to become rancid; they therfore gather it a little before it is ready to drop. Others again prefer gathering the fruit some little time before it is ripe, but the oil thus obtained is liable to be sharp or bitter. The fruit is sometimes beaten off with poles, a very injurious plan for the trees. The olives likewise are bruised, and unless used directly, the oil obtained from them has a bad flavour. The more tedious process of hand-gathering is therefore to be greatly preferred. In order to obtain the finest description of oil, the ripe fruit is conveyed at once to the mill, or if unripe, it is allowed to lie for 24 or 48 hours in a dry place until it begins to wrinkle. For inferior oil or for soap, the olives are heaped up in store-houses, sometimes for months together, and lose much oil from fermentation, while that which remains is greatly deteriorated in flavour. With proper precautions, however, such as frequent turning of the heaps, leaving spaces for the air to circulate, and keeping the several gatherings distinct, much of this loss may be avoided. The crushing of the olives is effected in a mill of the simplest construction, consisting sometimes of a single mill stone, turning in a circular bed : at others, of two mill-stones, placed far enough apart not to crush the seeds The workmen remove the pulp when sufficiently crushed, and place it in bags or sacks, which are heaped up on the platform of a press. This is also of a very rude description, and gives but a slow and feeble pressure. The oil which first exudes from the olives (supposing them to be of good quality) is a fine pure oil, much sought after for the supply of the table. It is known in commerce as *virgin salad oil*. After this is all extracted, there yet remains a considerable quantity so mixed with vegetable albumen that it cannot flow out. The bags of pulp are therefore lifted up, between each is poured a certain quantity of boiling water. This causes the pulp to swell by the absorption of the water : the albumen coagulates, and the more fluid oil flows freely. Still a certain quantity of oil remains among the refuse, and this is subjected to further treatment in separate workshops, the resulting oil being only fit for soap-making. The imperfection of the former process alone renders these latter ones necessary so that a large amount of time and labour is thus unnecessarily expended. As soon as the first run of fine oil is obtained from the olives, it is conveyed in jars or skins to a reservoir, and on the nature of this reservoir much of its after value depends. The town and report of Gallipoli owe much of their celebrity to the circumstance of the former being built on a rocky island, easily excavated into caverns and cisterns where the oil soon clarifies, and can be long preserved without becoming rancid. A Gallipolitan oil-house is described as being the ground-floor of a dwelling-house, in the stone basement of which 4, 6, or more circular holes are seen, about 2 feet in diameter, resembling the mouth of wells. These are the openings to separate cisterns reserved for different qualities of oil. The oil brought in a turbid state to these excellent reservoirs soon becomes bright and yellow, and in some cases may be kept for a period of 7 years. It is carried thither in sheep or goat-skins, generally on the backs of mules, and when it is to be shipped, it is drawn off from the cisterns into skins, and carried on men's shoulders to a house on the sea-shore, where there is a large open basin capable of containing a given quantity, and of measuring the liquid, and into that the porters empty their skins as they arrive. A tube leads from the basin to a large cock on the outside of the house. Under this cock are placed casks of various sizes, and the oil is thus conveniently drawn off into them. Coopers are at hand to close the casks securely, after which they are rolled down to the beach, and being fastened, several together, by ropes, they are attached to a boat, which tows them through the water to the ship's side. The number of persons employed in all these operations is very great, and their cheerfulness, frequently exhibited by singing in concert, gives a very lively effect to the whole scene. The produce of a full crop of oil, in the province of which Gallipoli forms the chief outlet, was, in 1843, nearly 22,000 tuns. Fine *Spanish soap*, known in England as *Castile soap*, is made of olive oil mixed with alkalies. A similar manufacture is carried on at Marseilles, which has a large export trade in soap. Olive oil is largely used in Greece. Italy, Spain, and France, as an article of food, and in medicine, and the arts. It is extensively used in England, especially in the woollen manufacture. The fine oil, called *Florence oil*, used for culinary purposes, is brought from Leghorn in chests containing 30 bottles, or 4 English gallons. Oil of olives varies in colour from greenish to pale yellow. A little above the freezing point of water it begins to deposit some white grains of stearine. At 22°, it deposits 28 per cent of its weight of stearine.—*Tomlinson*.

(5852) OLIVE, OLEA ATTENUATA. Wallich found a species of olive tree on the banks of the Salwen, but from which no oil is made—*Mason*.

(5853) OLIVE PLANTS, grow well at Dapoorie which is 1900 above the Sea.—*Spry's Suggestions*, p. 38.

(5854) OLIVE TREE OF CHINA ; OLEA FRAGRANS. (Thunberg, Fl. Jap. t. 2), is a native of China and Japan ; its flowers evolve a most delicious odour, and are sometimes used to perfume teas.—*O'Shaughnessy*, p. 433.

(5855) OLIVE WOOD. The matured wood of the olive is hard, compact, and reddish in colour. It takes a fine gloss, and is made into snuff boxes, and trinkets. *Waterston*—*Faulkner*.

(5856) OM MANI PADMI OM. A Buddhist prayer, in Sikkim and Thibet. Is an invocation of Sakkya, who is usually represented holding a lotus flower with a jewel in it: Its meaning is, Hail to him of the lotus and jewel. —*Hooker*, *Vol.* I. *p.* 229. Everywhere at Tumlong, in an oratory, the lotus, the mani, and the chirki (or wheel with three rays, emblematic of the Boodhist Trinity), were introduced; "Om Mani Padmi om" in gilt letters, adorned the projecting end of every beam, and the Chinese "cloud messenger," or winged dragon, floated in azure and gold along the capitals and beams, amongst scrolls and groups of flowers. At one end was a sitting figure of Gorncknath in Lama robes, surrounded by a glory, with mitre and beads.—*Hooker*, *Him. Jour.* *Vol.* II. p. 194. A mythical animal with a dog's head and blood-red spot over the forehead was not uncommon in this chapel, and is also seen in the Sikkim temples and throughout Tibet. Ermann, in his Siberian Travels, mentions it as occurring in the Khampa Lama's temple at Maimaochin; he conjectures it to have been the Cyclops of the Greeks, which according to the Homeric myth had a mark on the forehead, instead of an eye. The glory surrounding the heads of Tibetan deities is also alluded to by Ermann, who recognises in it the Nimbus of the ancients, used to protect the heads of statues from the weather, and from being soiled by birds, and adds that the glory of the ancient masters in painting was no doubt introduced into the Byzantine school from the Boodhists.—*Hooker*, *Him. Jour.* *Vol.* II. p. 195.

(5857) OMMASTREPHES, a genus of Cuttle-Fishes belonging to the family *Teuthidæ*. The Cuttel-Fishes of this genus closely resemble those belonging to *Loligo*. Besides other characters they may generally be distinguished by the short rhomboidal termination of the body, formed by the fins, combined with the hinder extremity.

(5858) OMUM WATER, is the distilled water from Bishop's weed seed. It is a useful carminative and largely used for children in Madras. At the Madras Exhibition of 1855, the late *Mr. Gay's* specimens of various pharmaceutical preparations, including *Omum Water*, *crystallized sugar of Omum*, &c. were considered creditable, and deserving of notice.—*Madras E. J. R.*

(5859) ONDATRA (Lacepede), a genus of Mammalian animals belonging to the family *Castoridæ*. Ondathra is the native name of the Musquash, or musk-rat, which has been adopted as its generic designation. The only species of this genus is the Musquash of America. Of this animal Sir John Richardson gives the following synonyms:—Rat-Musque of Sagard Theodat; *Castor Zibethicus* of Linnæus; L'Ondatra of Buffon; Musk-Rat of Lawson; Musk-Beaver of Pennant; *Mus Zibethicus* of Linnæus and Gmelin; *Fiber Zibethicus* of Sabine and Harlan; Musk-Rat of Godman; Musquash, Watsuss, or Wachusk, also Peesquaw-Tupeyew (the animal that sits on the ice in a round form), of the Cree Indians. In a tract which has for its title, 'A Perfect Description of Virginia,' 1649, we find among the "Beasts great and small . . . a Muske-Rat, so called for his great sweetnesse and shape."

Dental Formula:—Incisors, $\frac{2}{2}$; Molars, $\frac{3-3}{3-3} = 16$.

The head is short. Body thick and rather flat; legs very short, hind feet large, not webbed. Dark umber-brown above; sides, anterior part of belly, middle of breast, lateral part of neck and cheeks, shining yellowish-brown; chin, throat, sides of the chest, and posterior part of the abdomen, ash-gray; tail compressed, convex on the sides, with its acute edges in a vertical plane, covered with a thin sleek coat of short hairs, which allow a number of small roundish scales, well separated from each other, and which as well as the hair are dusky-brown, to appear through them; acute margins of the tail (which is rather thicker in the middle than at the root, and tapers gradually from its middle to its extremity, which is not acute) covered with a close line of longer hairs dark-brown on the upper edge and soiled white on the under one. Length of head and body 14 inches; of the tail, 8 inches 6 lines. The fur, which much resembles that of the beaver, but is shorter, resists the water during the life of the animal, but is easily wetted. Charlevoix states that the Musk-Rat takes the field in March, at which time its food consists of bits of wood, which it peels before it eats them. After the dissolving of the snows he says that it lives upon the roots of nettles and afterwards on the stalks and leaves of that plant. In summer it feeds on strawberries, &c. to which succeed the autumnal fruits. During this time he states that the male and female are rarely seen asunder. According to the same author they separate in winter, when each takes up its lodgings apart in some hole or in the hollow of a tree, without any provision; and the Indians declared that not the least morsel of anything is eaten by them whilst the cold continues. "They likewise," adds Charlevoix, "build cabins nearly in the form of those of the beavers, but far from being so well executed. As to their place of abode, it is always by the water-side, so that they have no need to build causeways.... The flesh is tolerable good eating, except in the time of rut, at which season it is impossible to cure it of a relish of musk, which is far from being as agreeable to the taste as it is to the scent." The habitations of the Musquashes, and the mode of hunting them, are thus described by Sir John Richardson:—"In the autumn, before the shallow lakes and swamps freeze over, the Musquash builds its house of mud, giving it a conical form, and a sufficient base to raise the chamber above the water. The chosen spot is generally amongst long grass, which is incorporated with the walls of the house, from the mud being deposited amongst it ; but the animal does not appear to make any kind of composition or mortar by tempering the mud and grass together. There is however a dry bed of grass deposited in the chamber. The entrance is under water. When ice forms over the surface of the swamp the Musquash makes breathing holes through it, and protects them from the frost by a covering of mud. In severe winters however these holes freeze up in spite of their coverings, and many of the animals die. It is to be remarked that the small grassy lakes selected by the Musquash for its residence are never so firmly frozen nor covered with such thick ice as deeper and clearer water. The Indians kill these animals by spearing them through the walls of their houses, making their approach with great caution, for the Musquashes take to the water when alarmed by a sound on the ice. An experienced hunter is so well acquainted with the direction of the chamber and the position in which its inmates lie, that he can transfix four or five at a time. As soon as, from the motion of the spear, it is evident that the animal is struck, the house is broken down, and it is taken out. The principal seasons for taking the Musquash are—the autumn before the snow fails,and the spring after it has disappeared but while the ice is still entire. In the winter time the depth of snow prevents the houses and breathing-holes from being seen. 'One of the first operations of the hunter is to stop all the holes with the exception of one, at which he stations himself to spear the animals that have escaped being struck in their houses, and come hither to breathe. In the summer the Musquash burrows in the banks of the lakes, making branched canals many yards in extent, and forming its nest in a chamber at the extremity, in which the young are brought forth. When its house is attacked in the autumn it retreats to these passages, but in the spring they are frozen up. The Musquash is a watchful but not a very shy animal. It will come very near to a boat or canoe, but dives instantly on perceiving the flash of a gun. It may be frequently seen sitting on the shores of small muddy islands in a rounded form, and not easily to be distinguished from a piece of earth, until on the approach of danger it suddenly plunges into the water. In the act of diving, when surprised, it gives a smart blow to the water with its tail." Sir John Richardson records three varieties besides that above described :—

1. The Black Musquash, rare.
2. The Pied Musquash, with dark blackish-brown patches on a white ground.
3. The White Musquash (*Fiber Zibethicus albus*, Sabine). This albino is not unfrequent.

According to Hearne, the Musquash is easily tamed, soon becomes attached, and is cleanly and playful. The fur is used in hat making, and upwards of one million of skins are imported into this cauntry.—*Eng. Cyc.*

(5860) ONONIS (from ὄνος, an ass, and ὀνημι, to delight, some of the species being said to be grateful to asses), a genus of Plants belonging to the natural order *Leguminosæ.* It has a 5-cleft campanulate calyx, narrow segments, the lower ones longer. The keel is beaked, the style filiform and ascending, the stigma terminal and subcapitate. There are 107 species of this genus described, but none of them are used in medicine or the arts. They are chiefly natives of Europe ; about twelve species are found in Africa, and a few on the coast of Asia. (Babington, *Manual of British Botany.*)—*Eng. Cyc.*

(5861) ONION : ALLIUM CEPA. Lin : Bulbus, D. The Bulb of the Common Onion.

Bussel, ARAB.
Bawnng. BALI.
Kembally, CAN.
Loono, CYNG.
Oignon, FR.
Zwiebel, GER.
Khanda, Peeaz, GUZ.
Peeaz, HIND.
Cipolla, IT.
Brangbang, JAV.
Bavangmira, MAL.
Peeaz, PERS.
Cebola, PORT.
Luk, RUS.
Palandu, Latarka, Sukundaka, SANS.
Cebolla, SP.
Venggayum, TAM.
Woolligudda, TEL.

The Onion is the κρομμωον of the Greeks, *Busl* of the Arabs, and the *Betzulim* of Numbers, xi. 12. Biennial. Bulb simple, roundish, invested with shining, thin, dry membrane. Stem 1—2 feet high, fistular, leafy, and often ventricose at the base. Leaves glaucous, distichous, fistular, terete-acute, shorter than the stem. Spathe reflexed. Umbels large, regular, globose, many-flowered, not bulbiferous. Flowers whitish or greenish, the segments with a green keel, linear-elliptic, obtuse, shorter than the stamens.—Cultivated in gardens in Europe ; flowers in July. Probably a native of the Persian region.—Fl. Græca, t. 326.—*Royle.* These well-known bulbous plants are extensively cultivated for pickling, culinary purposes, &c. They vary in size, flavour, and quality, according to the kind, soil, climate, and manner of cultivation. Those most esteemed in the Bombay Presidency are the Surat onions.—*Faulkner.* This vegetable is common all over India, and is sown broad-cast. When about six inches high it is pricked out into beds six fingers' breadth apart ; they are sown at almost all seasons of the year, and go to seed without difficulty.—*Riddell.* This is a favorite pot vegetable of the Natives of India, and is a constant ingredient in all their curries, pollaos, &c. &c. &c.—*Ainslie, p.* 246. The common English onion is sometimes cultivated in Tenasserim, but the principal part of the onions seen in the bazars are brought from Rangoon, and it is believed are of a different species.—*Mason.*

(5862) ONOSMA, (from ὄνος, an ass, and ὀσμη, smell; grateful to the ass), a genus of Plants belonging to the natural order *Boraginaceæ*. It has a 5-parted calyx, a tubularly campanulate corolla, and a naked throat. The anthers are sagittate, and connected together by the bases of the lobes. The nuts are ovate, strong, and fixed to the bottom of the calyx, unperforated at the base. The species are small scabrous canescent plants, with crowded lanceolate or linear leaves, and terminal racemes of large yellow secund and usually drooping flowers. —*Eng. Cyc.*

(5863) ONOSMA EMODI, has lanceolate triple-nerved leaves, less hairy beneath, terminal solitary racemes, linear bracts, not half so long as the flowers; the calyx is 5-cornered with ovate segments a ventricose 5-keeled corolla contracted towards the mouth, and the anthers longer than the filaments. It is a native of Nepaul, in Gosaingsthan, where it is called by the natives Maharanga. The root is branched, of a dark purple colour, and is used in dyeing.—*Eng. Cyc.*

(5864) ONOSMA MACROCEPHALA, ONOSMA BRACHEATUM, Royle, is officinal in Cashmere, and grows plentifully on the Himaayas; namely, on the Hindokoosh—near the Punjab-road, via Peembur to Cashmere. Flower-stem and root, are both of them efficacious and useful in medicine.—*Honigberger*, *p.* 316.

(5865) ONYX.

Onix, Onice, Fr.
Onyx, Ger.
Onyx, Lat.
Onique, Sp.

Onyx, one of the inferior gems, the silicious paricles are arranged in alternating horizontal layers f opaque white and translucent blue, gray, or rown, and because these have a resemblance to he marks on the human nail, the stone was calld from the Greek word for nail, ὄνυξ. It was nown to the ancients, and was employed by hem, as it is now, for those beautiful gems called ameos, the figure being cut out of the opaque hite, the dark part forming the ground, or the ontrary. It is most valuable, when the contrast f colours is strong, and when the layer is thick nough to give a high relief to the object to be ngraved. In the royal library at Paris there is n antique cameo cut out of an onyx with four yers, representing the apotheosis of Augustus, even inches by nine, which is supposed to be e finest in existence. Agates with an onyx ructure are not uncommon, particularly among lcedonies, but the finest are brought from India. ameos are sold at Rome, which are made from thick shell, having different coloured layers ke an onyx.—*Eng. Cyc.*

(5866) OOD BUTTEE, pastils of Wood loes, sandal wood, benjamin: Lichen rotunatus, the Patchonli, foliated gypsum; Talisutree (Flacourtia cataphracta) gum mastich, sugar-candy and gum, pounded fine and formed into pastils: They are made in every large town and burnt for the fragrance they give out.

(5867) OOD, IN INDIA. Is the name applied to Benjamin; and in Persia, to Wood Aloes.

(5868) OOLIES. Are bars of steel, fabricated from Vuttoms.

(5869) OONDEY OIL. Its source is not known, at Madras: is supposed to be a Fish oil manufactured at Malabar.

(5870) OOROOPA. Is the Malayalam name of a tree, which the Natives of that country prefer to take for building ships, being more durable and close grained.—*Ainslie. Rohde M. S. S.*

(5871) OOSARA-REWAND. STALAGMITIS GAMBOGIOIDES. Is real gamboge, and is imported via Pali; considered and used as a violent cathartic, the punsaris suppose it to be the extract of the Mirabilis jalapa root, the dose given is sixteen grains: one seer costs four rupees.—*Gen. Med. Top. p.* 148.

(5872) OOTRUM FIBRE. DÆMIA EXTENSA. Is a promising substitute for flax. The plant grows in the Madras Presidency.

(5873) OOTUNGUN. A seed used in medicine procurable in all Indian Bazars, obtained, according to Dr. Royle, from a species of Urtica.—*Honigberger.*

(5874) OPAL.

Opale, Fr.
Opal, Ger.
Opalo, It
Opalus, Lat.
Opala, Por.
Opalo, Piedrais, Sp.

Of this mineral, which is essentially a hydrate of silica, there are mentioned by Mr. Brooke, in the 'Encyclopædia Metropolitana,' eleven varieties, and nearly as many are described by Phillips.

Precious Opal or *Noble Opal.*—This mineral is white, bluish, or yellowish-white, and exhibits a beautiful variety or play of colours, as blue green, yellow, and red, several of which appear together. Fracture conchoidal, with a vitreous or resinous lustre; it is easily broken, but scratches glass. Specific gravity 2·06 to 2·09. Infusible by the blow-pipe, but becomes opaque and loses water. The most beautiful specimens occur in Hungary, but it has also been found in Saxony, South America, &c. Analysis of the Hungarian opal by Klaproth :—

Silica	90
Water	10
	—100

Fire-Opal.—In this the internal reflection is bright red. It occurs with the Precious Opal in Hungary, and has also been found in Cornwall.

Hydrophane.—It is usually opaque, but is rendered transparent, and exhibits the iridescent colours of the Precious Opal by immersion in water. According to klaproth it contains a little alumina in addition to silica and water.

Common Opal.—This is of various shades of colour, as white, green, yellow, and red; but is entirely destitute of the play of colours exhibited by the Noble Opal. In other properties they greatly resemble each other. It is stated to contain a little oxide of iron mixed with the silica and water. It is found chiefly in Hungary and Saxony, but specimens have also been produced in Cornwall and in the Dekhan.

Semi-Opal—This is more opaque than the Common Opal, and is dull. It occurs either white, gray, yellow, brown, or green. It is found in the same places as the foregoing.

Wood-Opal, so called from its showing the woody structure. It occurs of several tints of white, gray, brown, and black. It is generally harder than the Semi Opal, but does not materially differ from it in other properties. It occurs in Hungary, in Transylvania, and in Madura.

Cacholong is white opaque opal; harder than the Common Opal; dull; brittle; fracture flat conchoidal. Specific gravity 2·2. Infusible before the blow-pipe. It is found on the banks of the river Cach in Bucharia, in loose masses. It occurs also in the Faroe Islands, Greenland, and Iceland.

Opal Jasper, Ferruginous Opal.—Opaque, or but feebly transparent on the edges. Colour generally deep shades of red, yellow, and gray. Fracture flat conchoidal. It appears to be a silicate of iron with water. It occurs in Hungary, Siberia, and Madura. Klaproth's analysis of a variety from Telkebanya gave—

Silica … … … … … … …	43·5
Oxide of Iron … … … …	47·0
Water … … … … … … …	7·5
	98·0

Eng. Cyc.

(5875) OPERCULUM (Malacology), the plate or pieces which protect the apertures or exposed parts of certain Molluscs. In many of the Testaceous Gastropods it becomes a cover or door, which fits the aperture of the shell more or less accurately when the animal has retired within it. Opercula of this kind vary much in structure and shape. Thus they are sometimes horny, as in *Trochus* and *Murex*; sometimes shelly, nay almost stony as in *Turbo*; and in construction they are for the most part either spiral, concentric, or unguiculated. In Botany this term is chiefly used for the cap which forms the upper extremity of the theca, or sporangium, of a moss, covering over the peristome, and usually falling off when the spores are ready for dispersion. It has also been applied to the lid which covers in the Pitcher of *Nepenthes*, where it is the lobe of a modified leaf. —*Eng. Cyc.*

(5876) OPHELIA. Of this genus Wight gives Ophelia corymbosa, 1329-30; elatior, 1330 elegans, 1331; Grisebachiana, 1330; minor, 1332.

(5877) OPHELIA ANGUSTIFOLIA, OPHELIA ANGUSTIFOLIA, DON. (SWERTIA ROYLE). Nat. Ord. Gentianeæ.

Puharee Cheretta, HIND.

This species has long been used as a bitter tonic. Ind. An. No. 6. It is called Puharee chiretta in the hills, and is substituted for the true kind.—*O'Shaughnessy, p.* 460. *Exacum tetragonum* is similarly named *Oodu chiretta*, or purple chiretta.—*O'Shaughnessy, p.* 460.

(5878) OPHELIA CHIRATA, GRISEB: CHIRETTA HERB AND ROOT. (*Agathotes Chirayta*, Don.) Chiretta. *Tetrand*: *Monog* Linn. The bitter called *Chiretta*, or *Chiraeta*, is as universally employed throughout Southern Asia as Gentian is in Europe. It has long been known to the Hindoos, but there is no reason to suppose it to be the *Calamus aromaticus* of the ancients. (*v.* Himal. Bot. p. 277). The first English account is that of Dr. Fleming (in Asiat. Res. xi. p. 167), who referred it to the genus Gentiana, others to Swertia, and the late Prof. Don to Agathotes; Grisebach now refers it to Ophelia It is often confounded with another powerful Indian bitter, that is, Creyat, or Justicia paniculata. But there are several plants closely allied to the Chiretta, which are used for the same purposes, as stated in Him. Bot. p. 277. Thus, *Ophelia (Swertia*, Wall *angustifolia*, Don, is so in Northern India and called *puharee*, (*i. e.* hill) *chiretta*, to distinguish it from the true or *dukhunee* (southern *chiretta*. This is obtained from Nepal. *Exacum tetragonum* is called *oodu* (that is, purple) *chiretta* Ophelia chirata is an annual, of from 2—3 fee high, with a single, straight, round, smooth stem Branches generally decussated, nearly erect Leaves opposite, amplexicaul, lanceolate-acute smooth, 5—7-nerved. Flowers numerous, stalked upper half of the plant forming elegant decussate umbel-like cymes, with 2 bracts at each divisio Calyx 4-cleft, with sublanceolate persistent divisions, shorter than the corolla. Corol yellow rotate, limb 4-parted, spreading, whithering i æstivation, twisted to the right, with 2 glandular hollows protected by a fringed scale upo each segment. Stamens 4; filaments subulat shortly connected at the base; anthers clove at the base. Style single. Stigma large, 2-lobe Capsules conical, rather shorter than the permanent calyx and corol, 1-celled, 2-valved, openin a little at the apex. Seeds numerous, affixed t two receptacles adhering to the sides of t valves. Grows in the Himalaya mountains, which Nepal is one of the valleys.—Wall, Pl. As. Rar. 3. p. 33. t. 252.

Chiretta is met with in a dried state, tied up in bundles, with its long slender stems of a brownish colour, having the roots attached, and which have been taken up when the plant was in flower. The whole plant is bitter. Analysed by MM. Bousil and Lassaigne, they yielded a Resin, a yellow Bitter substance, a yellow colouring matter, Gum, Malic acid, Salts of Potash; and of Lime, and traces of Oxide of Iron. Mr. Battley states that it contains—1. A free Acid. 2. A very Bitter Extractive and Resinous matter, and much Gum. 3. Muriate and Sulphate of Lime and of Potash; also, that the Spirituous Extract is more aromatic than that of Gentiana lutea, but that the extractive and the gum are in larger proportion in the latter. Water and Spirit take up its active properties.

Action. Uses. Bitter Tonic; Stomachic in Dyspepsia or as a Tonic in Convalescence; either cold or hot infusion; the former is lighter, and well suited to Dyspeptics, and not so apt to create nausea in a hot climate. Sometimes a little Orange-peel or Cardamom is added. A Tincture made as that of Gentian (or ℥ ij. to Proof Spirit (℥ xvj.), like other bitters, is best taken half an hour before meals.—*Royle*.

(5879) OPHELIA ELEGANS, WIGHT. Grows plentifully in several parts of the Madras Presidency, is considered febrifuge by the Na- ive physicians who prefer it to the Himalayan 'hiretta. It grows plentifully in the Jeypore Zemindary of Vizagapatam, and is annually exported, as *Silaras* or *Selajit*, to the value of bout Rupees 2,500. The infusion of O. elegans as a powerful bitterness.—*Cleghorn*. "Ophelia legans," (vide Wight Icon. t 1331.) is closely llied to, and greatly resembles chiretta—the ative name is *Salaras* or *Salajit*: the stalks re sold bound together in bundles about one oot long, and a little thicker than a man's arm. he drug is exceedingly cheap, and the amount xported is considerable: to what extent it is mployed, is difficult to ascertain, as it is confounded in the bazar with "chiretta."—*M.E.* *.R.* This species of ophelia is common on the ulney Hills in Southern India, also in Vizagaatam, and the plant has long been used as a itter tonic.—*Med. An. No.* 6.

(5880) OPHIDIA, an order of Reptiles withut feet, and consequently, as Cuvier observes, ore deserving the name of Reptiles than any her order. According to Cuvier, the order *phidia* consists of the genus *Anguis* [BLIND-ORM], of True Serpents, and Naked Serpents. uvier's second family, or that of the True Serpents, comprehends the genera which have no ernum nor any vestige of a shoulder-blade, ut whose ribs still embrace a great part of the rcumference of the trunk, and the body of whose vertebræ are also articulated by means of a convex surface which is received into a socket or concavity of that vertebra which succeeds it. They want the third eyelid and the tympanum; but the ossiculum auditus exists under the skin, and its shaft or handle (so to speak) passes behind the tympanic bone. Many have vestiges of a posterior member under the skin, and the extremity of this rudiment of a limb shows itself externally in the form of a small hook. [BOIDÆ.] Those serpents to which the names of Doubles Marcheurs, or *Amphisbœnidæ* [AMPHISBÆNA; TYPHLOPS], have been given, have the lower jaw carried, as in the Tortoises [CHELONIA] and Lizards [SAURIA], by a tympanic bone which is articulated directly with the cranium, the two branches of that jaw soldered anteriorly, and those of the upper jaw fixed to the cranium and the intermaxillary bone, so that their mouth cannot be dilated, as in Cuvier's next tribe (the serpents properly so called), and their head is of uniform size with their body; a form and structure which enable them to make progress equally well in both directions, head or tail foremost. The bony frame of the orbit is incomplete backwards, and their eye is very small. Their body is covered with scales, the anus very near its extremity, the trachea long, and the heart placed very far backwards. Of this tribe no venomous species are known. The Serpents, properly so called, have the tympanic bone, or pedicle of the lower jaw, moveable, and nearly always suspended to another bone analogous to the mastoidian, attached to the cranium by muscles and ligaments which permit its mobility: the branches of this jaw are not united to each other except by ligaments, nor are those of the upper jaw united to the intermaxillary bone in any other manner, so that they can be more or less separated: a conformation which gives these animals the power of dilating their mouth to such an extent as to enable them to swallow bodies larger than themselves. Their palatine arches participate in this mobility, and are armed with pointed teeth curved backwards—the most marked and constant character of this tribe. Their trachea is very long; their heart situated very far backwards; and the greater number have only one very long lung, with the vestige of a second. These serpents, says Cuvier, in continuation, are divided into venomous and non-venomous; and the former are subdivided into venomous with many maxillary teeth, and venomous with isolated fangs. In the non-venomous, the branches of the upper jaws are furnished throughout their length, as well as those of the lower jaw and of the palatine branches, with fixed teeth which are not pierced; there are therefore four nearly equal rows of these teeth in the upper part of the mouth, and two in the lower. [BOIDÆ.] Those which have the mastoidian bones comprised in the cranium, the orbit incomplete backwards, and the tongue thick and short, much resemble the *Amphisbænidæ* in the cylindrical form of their head and body, and have, Cuvier observes, been united to the Orvets [ORVET], in consequence of the smallness of their scales. The Venomous Serpents with isolated fangs present a very peculiar structure in their organs of manducation. Their superior maxillary bones are very small, carried on a long pedicle analogous to the external pterygoid apophysis of the sphenoid bone, and very moveable: here is fixed a pointed tooth, pierced with a small canal which gives issue to a liquor secreted by a considerable gland situated under the eye. It is this liquor which, when shed into the wound made by the bite of the serpent, carries havock into the body of the wounded animal, and produces effects more or less fatal according to the species which has inflicted the wound. This fang is concealed in a fold of the gum when the serpent does not wish to use it; and there are behind it many germs destined to fix themselves in their turn, in order to replace it if it should be broken in the wound it makes. Naturalists, Cuvier remarks, have named these teeth crochets mobiles, or moveable fangs: but it is, properly speaking, the maxillary bone that moves: that bone carries no other teeth, so that, in the Venomous Serpents, only two rows of palatine teeth are seen in the roof of the mouth. All the venomous species bring forth their young alive, in consequence of the egg being hatched internally before it is laid, whence their general name of Vipers, a contraction of *Vivipares*. These deadly serpents with isolated fangs, though they present external characters of the same nature as the preceding group, have, the greater number of them at least, very dilatable jaws and a very exextensible tongue. Their head, wide behind, has generally a ferocious aspect, which announces in some degree their malevolent nature. [VIPERIDÆ.] A third tribe has the jaws organised and armed nearly as in the Non-Venomous Serpents, but the species have the first of their maxillary teeth greater than the others, and pierced so as to conduct the venom in the same manner as is effected in the Venomous Serpents with isolated fangs. Such are the *Bungari* and *Hydri*. [HYDRIDÆ; PELAMYS]. The serpents, with one exception (*Deirodon*, to which we shall presently more particularly call attention), subsist on living prey; and, whether non-venomous or venomous, have their teeth, as might be expected, admirably constructed and arranged for the purpose of securing their prey and assisting in deglutition. Professor Owen, in his valuable and copiously-illustrated 'Odontography,' observes that the order *Ophidia*, as it is characterised in the system of Cuvier, requires to be divided into two sections according to the nature of the food and the consequent modification of the jaws and teeth. Certain species, he observes, which subsist on worms, insects, and other small invertebrate animals, have the tympanic pedicle of the lower jaw immediately and immoveably articulated to the walls of the cranium; the lateral branches of the lower jaw are fixed together at the symphysis, and are opposed by the usual vertical movement to a similarly complete maxillary arch above: these, as we have above seen, belong to the genera *Amphisbæna* and *Anguis*, Linn. The rest of the Ophidians, observes the Professor, which form the typical members, and by far the greatest proportion of the order, prey upon living animals, frequently of much greater diameter than their own; and the maxillary apparatus is, as we have also above seen, conformably and peculiarly modified to permit of the requisite distention of the soft parts surrounding the mouth and the transmission of the prey to the digestive cavity. But the mechanism by means of which this distention is accomplished, and which is in fact a dislocation of adapted parts which return to their original positions when the act of deglutition is accomplished, requires, to be well understood, a more particular description than the general account above given, and we proceed to that presented by Professor Owen, as the best and clearest known to us. The two superior maxillary bones have, he observes, their anterior extremities joined by an elastic and yielding fibrous tissue with the small and single intermaxillary bone: the symphysial extremities of the lower maxillary rami are connected together by a similar tissue, allowing of a still wider lateral separation. The opposite or posterior extremity of each ramus is articulated to a long and moveable vertical pedicle, formed by the tympanic or quadrate bone, which is itself attached to the extremity of a horizontal pedicle formed by the mastoid bone, so connected as also to allow of a certain yielding movement upon the cranium. The palatine and pterygoid bones have similarly loose and moveable articulations, and concu with the other dentigerous bones of th mouth in yielding to the pressure of larg bodies with which the teeth may have grappled Professor Owen first describes the dental peculiarities of the true serpents, which, as he remarks, swallow their food whole, whether the prey on living animals, as is the case in almos every species, or feed on the eggs of birds, a does *Deirodon scaber*, Owen (*Coluber scabe* Linn). With the exception of this and som congeneric species, in which the teeth of the ord nary bones of the mouth are so minute as t have been deemed wanting, the maxillary an premandibular bones in all true Ophidians ar he observes, formidably armed with sharp poin ed teeth; there is on each side of the palate row of similar teeth supported by the palatin and pterygoid bones: in the great Pythons and some species of *Boa*, he adds, the intermaxillary bones also support teeth. But whatever be their position, all the teeth, according to the Professor, present a simple conical form, the cone being long, slender, and terminated by an acute apex, and the tooth is either straight, or more commonly bent a little beyond the base, or simply recurved, or with a slight sigmoid inflection. Thus the teeth are adapted for piercing, tearing, and holding, not for dividing or bruising. Certain teeth in some species are traversed by a longitudinal groove, as above noticed, for conveying an acrid saliva into the wounds which they inflict; in others, two or more teeth are longitudinally perforated for transmitting venom. These poison-fangs, he remarks, are always confined to the superior maxillaries, as we have already stated, and are generally placed near the anterior extremity of those bones. Professor Owen notices in the first instance the serpents whose teeth are all simple and solid, where the pulp which occupies the basal cavity is calcified. After this the teeth of the poisonous serpents are described, and Professor Owen calls attention to the fact that in certain genera of non-venomous serpents, as in *Dryophis*, *Dipsas*, and *Bucephalus*, in which the superior maxillary teeth increase in size towards the posterior part of the bone, the large terminal teeth of the series are traversed along their anterior and convex side by a longitudinal groove. In the *Bucephalus Capensis* the two or three posterior maxillary teeth present this structure, and are much larger than the anterior teeth or those of the palatine or premandibular series; they add materially therefore, he observes, to the power of retaining the prey, and may conduct into the wounds which they inflict an acrid saliva, but they are not in connection with the duct of an express poison-gland. The long grooved fangs are either firmly fixed to the maxillary bones, or are slightly moveable, according to their period of growth; they are concealed by a sheath of thick and soft gum, and their points are directed backward. The sheath also contains loose recumbent grooved teeth, ready to succeed those in place. In most of the Colubers each maxillary and premandibular bone includes from 20 to 25 teeth: they are less numerous in the genera *Tortrix* and *Homalopsis*, and are reduced to a still smaller number in the poisonous serpents, in the typical genera of which the short maxillary bone supports only a single perforated fang. The transition to the poisonous serpents, which was begun in the *Bucephali* and allied genera with grooved maxillary teeth, is, according to Professor Owen, completed by the poisonous serpents of the genera *Pelamys*, *Hydrophis*, *Elaps*, *Bungarus*, and *Hamadryas*, which latter genus, as its cervical integument can be expanded into a hood, constitutes an immediate link between the *Bungarus* and *Naja*. The structure of the venom-fangs of serpents, and the machinery by which their deadly agency is brought to bear against those who are so unfortunate as to be the objects of their attacks, are so interesting, that we subjoin the following remarks in the author's own words :—“ The superior maxillary bone diminishes in length with the decreasing number of teeth which it supports. The transverse or external pterygoid bone elongates in the same ratio, so as to retain its position as an abutment against the shortened maxillary, and the muscles implanted into this external pterygoid style communicate through it to the maxillary bone the hinge-like movements backwards and forwards upon the ginglymoid articulations, connecting that bone with the anterior frontal and palatine bones. As the fully-developed poison-fangs are attached by the same firm basal anchylosis to shallow maxillary sockets, which forms the characteristic mode of attachment of the simple or solid teeth, they necessarily follow all the movements of the superior maxillary bone; when the external pterygoid is retracted, the superior maxillary rotates backwards, and the poison fang is concealed in the lax mucous gum, with its point turned backwards: when the muscles draw forward the external pterygoid, the superior maxillary bone is pushed forwards, and the recumbent fang withdrawn from its concealment and erected. “ In this power of changing the direction of a large tooth, so that it may not impede the passage of food through the mouth, we may perceive an analogy between the Viper and the Lophius; but in the fish the movement is confined to the tooth alone, and is dependant on the mere physical property of the elastic medium of attachment. In the serpent the tooth has no independent motion, but rotates with the jaw, whose movements are governed by muscular actions. In the fish the great teeth are erect, except when pressed down by some extraneous force; in the serpent the habitual position of the fang is the recumbent one, and its erection takes place only when the envenomed blow is to be struck. “ The peculiar structure of the poison-fang was first described by Fontana, as it exists in the Viper, and subsequently received additional elucidation by Mr. Smith's careful examinations of the fangs of the *Hydrus*, *Naja* and *Crotalus*, and by Mr. Clift's illustrative drawings appended to Mr. Smith's paper. A true idea of the structure of a poison-fang will be formed by supposing the crown of a simple tooth, as that of a *Boa*, to be pressed flat, and its edges to be then bent towards each other, and soldered together so as to form a hollow cylinder open at both ends. The flattening of the fang, and its inflection around the poison-duct, commence immediately above the base, and the suture of the inflected margins runs along the anterior and convex side of the recurved fang; the poison-canal is thus in front of the pulp-cavity. The basal aperture of the poison-canal is oblique, and its opposite outlet is still more so, presenting the form of a narrow elliptical longitudinal fissure, terminating at a short distance from the apex of the fang. "The character most commonly adduced from the dental system, as distinguishing the venomous from the non-venomous serpents, is, that the former have two, the latter four, rows of teeth in the upper jaw; the two outer or maxillary rows being wanting in the venomous species, and their place being supplied by the single poison-fang. The exceptions to this rule are however too numerous for its value as a distinguishing character in a question of such practical moment as the venomous or non-venomous properties of a serpent. In all the family of Marine Serpents the poison-fang is only the foremost of a row of fixed maxillary teeth. In the *Hydrophis striatus* there are four teeth, and in *Hydrophis schistosa* five teeth, behind the venom fang, of rather smaller size than it; the Two-Coloured Sea-Snake (*Pelamys bicolor*) has also five maxillary teeth in addition to the perforated one. The poison fang in this genus is relatively smaller than in the venomous serpents of the land, but present the same peculiar structure. The poison-gland presents a correspondingly small development; it is pyriform, and its structure, according to Dr. Cantor ('Zool. Trans.,' vol. ii. p. 304), minutely cellular; it is covered by the aponeurotic expansion of the articulo-maxillaries, and transmits a straight duct horizontally to the basal opening of the venom-fang. It is a curious fact that the smaller non-venomous teeth of the poisonous serpents all present a trace of the structures of the functional venom-fang, being more or less deeply grooved along the convex anterior side; and in the *Hydrus* this groove commences by a depression analogous to the oblique basal aperture of the poison-canal in the true fang. "The colubriform poisonous serpents of the land have comparatively short venom fangs, but they are larger than those of the pelagic serpents; and behind the venom-fangs there are likewise some smaller grooved teeth in the maxillary bones; there are three such teeth in the *Bungarus Pama*, and five in the *Bungarus annulatus*. In the *Hamadryas*, or Great Hooded Poisonous Tree-Snake of India, the venom-fang is relatively as large as in typical poisonous serpents, but three or four smaller grooved teeth are implanted behind it on the maxillary bone. "In the most deadly venom-snakes, as the Viper (*Berus*), the Puff-Adder (*Vipera*), the Asps or Hooded Snakes (*Naja*), the Rattle-Snakes (*Crotalus*), and the Cophias and Fer-de-Lance (*Trigonocephalus*,) the poison-fangs acquire their largest size, and are associated only with their successors. These are clustered in greater or less number behind them, presenting the same structure, but of a size proportionate to their degree of development, and further differing in being loosely imbedded in the thick and wide mucous gum, which likewise conceals the fixed and functional fang in its ordinary position of retraction and repose. This fang is more strongly curved backwards than the ordinary teeth, but its acute and slender apex is frequently bent slightly in the contrary direction, as in the Rattle-Snake. The mechanism by which the short maxillary bone and the poison fang are rotated backwards and forwards upon the ginglymoid joint that connects the maxillary with the præfrontal and palatine bones has already been noticed; and as some description of the secreting apparatus to which the peculiar modification of the venom-fang is subservient might here be expected, I have selected for its illustration the accurate figure which Professor Muller has given of the salivary and poison-glands in the *Trigonocephalus lanceolatus*, in his great work on the glandular system. ('De Glandularum Secernentium Structura Penitiori,' fol., tab. vi. fig. 1, p. 55.) "The poison-glands occupy the sides of the posterior half of the head; each consists of a number of elongated narrow lobes, extending from the main duct which runs along the lower border of the gland upwards and slightly backwards. Each lobe gives off lobules throughout its extent, thus presenting a pinnatifid structure; and each lobule is subdivided into smaller secerning cæca, which constitute the ultimate structure of the gland. The whole gland is surrounded by a double aponeurotic capsule, of which the outermost and strongest layer is in connection with the muscles by whose contraction the several cæca and lobes of the gland are compressed and emptied of their secretion. This is then conveyed by the duct to the basal aperture of the poison-canal of the fang. We may suppose, that as the analogous lachrymal and salivary glands in other animals are most active during particular emotions, so the rage which stimulates the venom-snake to use its deadly weapon must be accompanied with an increased secretion and great distension of the poison-glands; and as the action of the compressing muscles is contemporaneous with the blow by which the serpent inflicts its wound, the poison is at the same moment injected with force into the wound from the apical outlet of the perforated fang. "The duct which conveys the poison, although it runs through the centre of a great part of the tooth, is nevertheless, as we have seen, really on the outside of the tooth, the canal in which it is lodged and protected being formed by a longitudinal inflection of the parieties of the pulp-cavity or true internal canal of the tooth. This inflection commences a little beyond the base of the tooth, where its nature is readily appreciated, as the poison-duct there rests in a slight groove or longitudinal indentation on the convex side of the fang; as it proceeds it sinks deeper into the substance of the tooth, and the sides of the groove meet and seem to coalesce, so that the trace of the inflected fold ceases in some species to be perceptible to the naked eye; and the fang appears, as it is commonly described, to be perforated by the duct of the poison-fang. "From the real nature of the poison-canal, it follows that the transverse section of the tooth varies in form in different parts of the tooth: at the base it is oblong, with a large pulp-cavity of a corresponding form, with an entering notch at the anterior surface; farther on, the transverse section presents the form of a horse-shoe, and the pulp-cavity that of a crescent, the horns of which extend into the sides of the deep cavity of the poison-fang. A little beyond this part the section of the tooth itself is crescentic, with the horns obtuse and in contact, so as to circumscribe the poison-canal; and along the whole of the middle four-sixths of the tooth the section shows the dentine of the fang inclosing the poison-cavity, and having its own centre or pulp-canal, in the form of a crescentic fissure situated close to the concave border of the inflected surface of the tooth. The pulp-cavity disappears, and the poison canal again assumes the form of a groove near the apex of the fang, and terminates on the anterior surface in an elongated fissure. "If the end of each inflected fold of cement in the tooth of the *Labyrinthodon* were dilated sufficiently to contain a tube, that tooth might convey the ducts of fifty poison-glands deeply imbedded in its substance, and yet all of them actually on the outside of the tooth itself; it is the existence of a single fold of the same kind, but more simple, inasmuch as it is straight instead of wavy, which forms the complication of the viper's fang subservient to the completion of its peculiar offensive weapon. "The venom-fangs of the Viper, Rattle-Snake, and Fer-de-Lance are coated only with a thin layer of a subtransparent and minutely cellular cement. The disposition of the calcigerous tubes is obedient to the general law of verticality to the external surface of the tooth. Since the inflected surface of he tooth can be exposed to no other pressure han that of the turgescent duct with which it is n contact, the tubes which proceed to that surface. while maintaining their usual relation of he right angle to it, are extremely short, and the ayer of dentine separating the poison-tube from the pulp-cavity is proportionally thin. The calcigerous tubes that radiate from the opposite side of the pulp-cavity to the exposed surface of he tooth are disproportionately long. "The pulp-cavity, following the form of the tooth tself, presents in a transverse section of this part the form of a fissure describing four-fifths of a circle; the fissure is widest at the middle and at the two extremities; the exterior calcigerous tubes, in quitting the pulp-cavity, form a graceful curve, the convexity being turned towards the nearest horn of the crescent; at the middle of the pulp-fissure the tubes proceed straight to the opposite surface; and at the two extremities of the crescent the central tubes are nearly straight, while the lateral ones radiate in graceful curves which become bolder as they diverge from the central and straighter tubes. Throughout the greater part of the tooth the calcigerous tubes describe their various inflections in a plane transverse to the axis of the tooth; but towards the apex they begin gradually to rise from that plane; and as the pulp-cavity reassumes, with the tooth itself, the simple conical form beyond the termination of the poison-canal, the calcigerous tubes extend to equal distance from the linear-remnant of the pulp-cavity, which has again passed to the centre of the tooth, and those tubes which are continued from its extremity pass to the apex of the fang in a line parallel with the axis of the tooth. The calcigerous tubes present secondary curvatures of a slightly wavy character, which become more marked and irregular near their termination. In whatever part of the section an entire tube could be clearly traced to its termination, it formed an anastomotic loop at the periphery of the dentine with an adjoining tube. The calcigerous tubes present a diameter of the 118,000th of an inch, and they are separated by interspaces equal to four of their own diameters. Each calcigerous tube gives off many primary branches in its course, but is rarely seen to divide dichotomously until it begins to form its irregular sinuosities near the periphery of the tooth. In the transverse section, the primary branches are sent off from the concave side of the tube, at an acute angle with the trunk; the secondary smaller and more numerous branches proceed from the same side of the main tube or of its primary branches, at a less acute angle, into the clear uniting substance; they are remarkably parallel with each other and straight. In old poison fangs the pulp-cavity or fissure is obliterated by ossification of the remains of the pulp. "The external layer of cement is very thin where it covers the crown of the tooth; it is best seen at the line of union of the coadapted margins of the inflected tooth. At this part the cement is more abundant in the viper's tooth, and its transparency permits a bristle inserted into the poison-canal to be seen through it. The layer which coats the inflected surface of the fang is thinner than the outer one, which, from its transparency, has been regarded as enamels There is however no trace of true enamel upon the teeth of the poisonous serpents, any more than upon those of the innocuous species. The cells of the cement are more minute and inconspicuous in the poison-fang than in the simple teeth of the Python and Boa. "The teeth of all Ophidians are developed and completed in the original seat of the tooth-germs in all animals, namely, the mucous membrane or gum covering the alveolar border of the dentigerous bones. This gum presents the same lax tissue and is as abundantly developed as in the Pike, Lophius, and many other fishes, in which it likewise serves as the nidus and locality for the complete development of the teeth. "The primitive dental papilla in the common harmless snake very soon sinks into the substance of the gum and becomes inclosed by a capsule. As soon as the deposition of the calcareous salts commences in the apex of the papilla, the capsule covering that part becomes ossified and adherent to the dentine, and the tooth begins to pierce and emerge from the gum, before its mould, the pulp, is half completed. Fresh layers of cells are successively added to the base of the pulp, and converted by their confluence and calcification into the tubular dentine, until the full size of the tooth is attained, when its situation in the gum is gradually changed, and its base becomes anchylosed to the shallow cavity of the alveolar surface of the bone. " In the posterior part of the large mucous sheath of the poison fang, the successors of this tooth are always to be found in different stages of development; the pulp is at first a simple papilla, and when it has sunk into the gum the succeeding portion presents a depression along its inferior surface, as it lies horizontally, with the apex directed backwards; the capsule adheres to this inflected surface of the pulp. But how the cylindrical cavity of the dilated fold is occupied in the loose growing poison-fang, and by what contrivance it is brought into the same relation with the severed duct of the poison-gland as the displaced fang which it succeeds, is not yet clearly understood." The following list of the distribution of the Asiatic species of *Ophidia* is given by Dr. J. E. Gray inhis 'Catalogue of Snakes' in the British Museum. In this list the *Colubridæ* are not included :—

Asia and its Islands.

Tri esurus viridis
T. albolabris. *China.*
T. carinatus.
T. purpureus.
T. maculatus. *Borneo.*
T. subannulatus *Philippines.*
T. Philippensis
T. strigatus. *Ceylon*
T. Sumatranus. *Sumatra.*
T. formosus. *Borneo.*
T. Ceylonesis *Ceylon.*
Parias flavomaculatus. *Philippines.*
P. ornatus. *Philippines.*
P. variegatus. *Philippines..*
Megæra trigonocephala. *Ceylon.*
Atropos acontia. *Java.*
Enhydrina Bengalensis.
E. Valakadyen.
Trigonocephalus Halys *Tartary.*
T. Blomhoffi. *Japan.*
T. rhodostoma. *Java.*
Y. hypnale. *Ceylon.*
T. zara
Daboia elegans.
D. Russellii.
D. Xanthina. *Xanthus.*
Echis carinata.
Pelamis bicolor.
P. ornata.
Lapemis curtus.
L. Hardwickii.
Aturia ornata.
A. Belcheri.
A Lapemoides.
Microcephalophis gracilis.
Phytolopsis punctata.
Tropidophis schistosus.
Hydrophis obscura.
H. Lindsayii.
H. fasciata.
H. nigrocincta.
H. subcincta.
H. sublævis.
H. mentalis.
H. spiralis
H. subannulata.
H. aspera.
H. cœrulescens.
Chitulia inornata.
C. fasciata.
C. schistosa.
Kerilia Jerdonii
Hydrus annulatus
Tomogaster Eydouxii.
Chersydrus granulatus.
C. annulatus.
Acrochordus Javanicus. *Java.*
Cerberus cinereus.
C. acutus. *Borneo.*
C. unicolor. *Philippines.*
Ferania Sieboldii.
Homalopsis buccata.
H. Hardwickii.
Myron trivittatus (?).
Hypsirhina plumbea.
H. Hardwickii.
H. Aer.
H. bilineata.
H. Chinensis.
H. Bennettii.
Fordonia leucobalia.
F. unicolor.
Raclitia Indica.
Miralia alternans.
Xenodermus Javanicus. *Java.*
Python reticulatus.
P. molurus.
Liasis amethystina. *New Ireland.*
L. Macklotii.
Nardoa Schlegelii.
Clifiia fusca.
Enygrus carinatus.
Casoria elegans
Gongylophis conica.
Clothonia Johnii.
Cylindrophis melanota.
C. rufa.
C. maculata.—*Eng. Cyc.*

(5881) OPHIOGLOSSACEÆ, *Adders Tongues*, a natural order of Aerogenous Plants, belonging to the alliance Filicales. They have an erect or pendulous stem, with a cavity in the middle instead of pith, and two or three woody bundles placed round it in a ring; the stalks of the leaves and the stem become blended together below; the leaves have netted veins; the spore-cases are collected into a spike formed out of the sides of a contaracted leaf, 2-valved, without any trace of an elastic ring; spores resembling fine powder. These plants are a transition from Ferns to *Lycopodiaceæ*. The species are most abundant in the islands of tropical Asia. They occur however in the West Indies and in the tropical parts of Africa, at the Cape, and in Tasmania. They are of little or no known use. The following genera with about 25 species belong to this order:—*Ophioglossum*, *Ophiodema*, *Helminthostachys*, *Botrycyium*.—*Eng. Cyc.*

(5882) OPHIOGLOSSUM (οφις, a snake, and γλῶσσα, the tongue), a genus of Plants belonging to the natural order *Ophioglossaceæ*. The thecæ are connate, disposed in a simple distichous spike attached to an undivided frond.—*Eng. Cyc.*

(5883) OPHIORRHIZA MUNGOS. LOHECH OF AVICENNA, *Roxb. Fl. Ind.* i. 701.

Wal, eka, weriya, CING.

A native of Java, Ceylon, and Sumatra; al parts are intensely bitter; it has high reputatio as a remedy for snake-bites. Roxburgh altogether discredits its supposed virtues. This plant is often confounded with the Ophioxylo serpentinum, of the family of *Apocyneæ*, (*Chundra*, Bengalee), described by Roxburgh, (Fl Ind. ii. p. 530, *ed. Carey*) and by Ainslie, vol ii. 441.—*O'Shaughnessy, p.* 400. Dr. Wight, in Icones gives, Ophiorrhiza eriantha, 1067; gran diflora, 1069; Harrisonii, 1162; Roxburghiana 1068.

(5884) OPHIOXYLON (from ὄφις, a ser pent, and ξύλον, wood, because it has a twiste oot and stems), a genus of Plants belonging to he natural order *Apocynaceæ*. It has a 5 cleft ermanent calyx, a funnel shaped corolla with a ong tube, thickest in the middle, and a five cleft blique limb. The anthers are subsessile, inserted ito the middle of the tube. The ovary is double, ach lobe with one ovule, a filiform inclosed tyle and a capitate stigma. The drupes are accate, black, about the size of a pea, twin, or olitary by abortion, each containing a 1-seeded rinkled nut.—*Eng. Cyc.* Wight gives Ophixylon Belgaumense, 1292; Ceylanicum, 1291; acrocarpum, 1292; Neilgherrense, 1292; ser-entinum, 849.

(5885) OPHIOXYLON SERPENTINUM. CARLET FLOWERED OPHIOXYLON, Lin. Various rts of India. See Roxb. Fl. Ind. i. p. 694.

Soovana Amel podie, MAL.
Chota Chand, HIND.
Acawerya, CYNG.
Chandraca, SANS.
Chota Chand, BENG.

Serpentine Snake-Wood, is a native of the East dies. In rich soil it becomes a climbing plant, but poor soil it is a small erect shrub. The leaves e in threes or fives; they are short-stalked, long, pointed, wavy, and smooth. The peuncles are long, smooth, round, sometimes arly erect, somtimes drooping. The pedicles d calyxes are of a bright red colour, and the rollas white. In India the root of this plant employed by the Telinga physicians as a reedy in many diseases.—*Eng. Cyc.* The stems woody, erect, climbing, and twining. The ot is used as a febrifuge, as an antidote to ake poison, and to *promote delivery* in tedis cases. *Lindley, page* 532.—*O'Shaughnessy, ge* 447. Soovana Amelpoodie is the name ven on the Malabar Coast to this plant, the ot of which is supposed to have sovereign vires in cases of snake bites and scorpion stings: is prescribed in decoction to the extent of a nt in the twenty-four hours and the powder applied externally to the injured part. See *rt. Mal. Part.* 6, *page* 82. This plant is by ne believed to be that to which the Mungoose hneumon) was said to have recourse in his ttles with poisonous serpents.—*Ains. Mat. d. p.* 115.

(5886) OPLISMENUS STAGNINUS. Culated in the gardens at Kotah, but the inbitants do not believe in its reputed virtues.—*l. Med. Top. p.* 185.

Enormous islets of living water-grasses (*Oplisnus stagninus*) and other plants, float on Megny river.—*Hooker, Him. Jour. Vol.* II *e* 338.

5887) OPIUM.

fyoon, ARAB.
apium, BALI
bim, CYNG.
pium, FR.
ohnsaft, GER.
Opium, LAT.
Ufyoon, Caruppa, MAL.
Sheer-i-kush-khush, Ufyoon, PERS.
Opio, PORT.
Ufeem, Ufyoon, GUZ. & HIND.
Oppio, IT.
Apium, JAV.
Chasa, Apayunum, SANS.
Opio, SP.
Apini, TAM. & TEL.
Majoon, TURK.—*Faulk.*

Opium is the concrete inspissated juice of the white poppy, *Papaver somniferum* and its varieties, obtained by scratching the capsules and collecting the exuding juice. The plant has been long known, and is perhaps one of the earliest described. It is a native of Western Asia and probably also of the South of Europe, but it has been distributed over various countries. In 1826, the imports of opium into the United Kingdom were 79,829 lbs., of which 28,329 lbs, were consumed in England. The imports and consumption in subsequent years are shown by the following figures: —

	Imports. lbs.	Consumption. lbs.
1827	113,140	17,322
1830	209,076	22,668
1833	106,846	35,407
1836	130,794	38,943
1839	196,247	41,632
1842	72,373	47,432
1845	259,644	38,229
1848	200,019	61,055
1849	105,724	44,177
1850	126,318	42,324
1851	118,024	50,682
1852	205,780	62,521

Few who have not looked into the statistics of this trade, are aware of the enormous consumption of opium all over the world, but chiefly in China and India. In 1845, 18,792 chests of opium were sent from Calcutta to China, and nearly the same number of the Malwa opium from Bombay and Damaun. The total production of India exported to China, in 1844, was 21,526 chests from Bengal, and 18,321 from Bombay, in all 39,847 chests. The number of persons in China given to the consumption of opium was estimated, in 1837, at three millions, and the average quantity smoked by each individual is about 17½ grains a day. The consumption of Indian opium (independent of Turkey opium) in China has gradually increased from 3,210 chests in 1817, to 9,969 chests in 1827, and about 40,000 chests in 1837, valued at 25,000,000 dollars. Now it has reached 50,000 to 60,000 chests. Notwithstanding severe penalties, imprisonment, temporary banishment, and even death, the number of those who smoke opium has multiplied exceedingly, and the contraband trade in the drug is carried on to so large an extent, that it is to be feared the practice will become general throughout the empire. According to Mr, E. Thornton's statistics, the production of opium in Bengal has increased cent. per cent. in the last ten years:—

	chests.
1840-41	17,858
1841-42	18,827
1842-43	18,362
1843-44	15,104
1844-45	18,350
1845-46	21,437
1846-47	21,648
1847-48	30,515
1848-49	36,000

The chest is about 140 lbs., so that the production in 1849 was 5,040,000 lbs. According to the statements annexed to the statistical papers relating to India, the income from the opium monopoly is obtained by two principal means, namely, by a system of allowing the cultivation of the poppy by the natives of British India on account of Government, and by the impost of a heavy duty on opium grown and manufactured in foreign states, but brought in transit to a British port for exportation. The former system obtains in Bengal, the latter in Bombay. According to the statements published, Bengal opium yields a profit of 7s. 6d, per lb., whilst the duty derived in the Bombay presidency is only equal to a surplus of 5s 8d. per lb. By these means the total revenue realised by the opium monopoly, in Bengal and Bombay, in the year 1849-50 yielded £3,309,637.

The white variety of the poppy is that which is exclusively brought under cultivation for the production of the drug in India and Egypt. For the successful culture of opium a mild climate, plentiful irrigation, a rich soil, and diligent husbandry are indispensable. One acre of well cultivated ground will yield from 70 lbs. to 100 lbs. of "chick," or inspissated juice, the price of which varies from 6s. to 12s. a pound, so that an acre will yield from £20 to £60 worth of opium at one crop. Three pounds of chick will produce one pound of opium, from the third to a fifth of the weight being lost in evaporation. A chief chemical feature, which distinguishes Bengal opium from that of Turkey and Egypt, is the large proportion which the narcotine in the former bears to the morphia, and this proportion is constant in all seasons. It is a matter of importance to ascertain whether the treatment which the juice receives after its collection can influence in any way the amount of alkaloids, or of the other principles in opium. In Turkey it is the custom to beat up the juice with saliva, in Malva it is immersed as collected in linseed oil, whilst in Bengal it is brought to the required consistence by mere exposure to the air in the shade, though, at the same time, all the watery particles of the juice that will separate are drained off, and used in making *Lewah*, or inferior opium.

The lands selected for poppy cultivation are generally situated in the vicinity of villages where the facilities for manuring and irrigation are greatest. In such situations and when the soil is rich, it is frequently the practice with the cultivators t take a crop of Indian corn, maize, or vegetables, off the ground during the rainy season, and after the removal of this in September, to dress an manure the ground for the subsequent poppy sowings. In other situations, however, and whe the soil is not rich, the poppy crop is the onl one taken off the ground during the year, an from the commencement of the rains in June o July, until October, the ground is dressed an cleaned by successive ploughings and weedings and manured to the extent which the means o the cultivator will permit. In the final preparation of the land in October and November, th soil, after being well loosened and turned up b the plough, is crushed and broken down by th passage of a heavy log of wood over its surface and it is in this state ready for sowing. Th amount of produce from various lands differ considerably. Under very favorable circumstances of soil and season, as much as twelve or eve thirteen seers (26 lbs.) of standard opium ma be obtained from each biggah of 27,22 square feet. Under less favorable condition the turn-out may not exceed three c four seers, but the usual amount of pr duce varies from six to eight seers per biggal The chemical examination of different soils i connection with their opium-producing power presents a field for profitable and interesting i quiry; nor is the least important part of the i vestigation that which has reference to variatio in the proportions of the alkaloids (especially t morphia and narcotine), which occur in opiu produced in various localities. That atmo pheric causes exert a certain influence in dete mining these variations is probable; that th influence the amount of produce, and cause alter tions in the physical appearance of the drug, a facts well known to every cultivator: thus t effect of dew is to facilitate the flow of the jui from the wounded capsule, rendering it abunda in quantity, but causing it at the same time be dark and liquid. An easterly wind (which India is usually concomitant with a damp sta of atmosphere), retards the flow of juice, a renders it dark and liquid. A moderate wester wind, with dew at night, form the atmosphe conditions most favorable for collection, both regards the quantity and quality of the exud tion. If, however, the westerly wind (which an extremely dry wind) blow violently, the e udation from the capsules is sparing. Whi the effect of meteorological phenomena in pr ducing the above results are well marke their action in altering the relative propo tions of the chemical constituents of t juice of the poppy plant is more obscu and it is highly probable that the chemi composition of the soil plays a most importa part in this respect. Dr. O'Shaughnessy

ertainly the most accomplished chemist who
nad ever, in India, turned his attention to the
subject, and he has published the results of his
nalyses of specimens of opium from the different
livisions of Behar Agency, which are worthy of
nuch attention. In the opium from eight divi-
ions of the agency, he found the quantity of
norphia to range from $1\frac{3}{4}$ grains to $3\frac{1}{2}$ per cent.,
nd the amount of the narcotine to vary from $\frac{3}{4}$
rain to $3\frac{1}{2}$ grains per cent, the consistence of
he various specimens being between 75 and 79
er cent. In the opium from the Hazareebaugh
istrict (the consistence of the drug being 77),
e found $4\frac{1}{2}$ per cent. of morphia, and 4 per
ent. narcotine; whilst from a specimen of Pat-
a-garden opium he extracted no less than $10\frac{3}{4}$
er cent. of morphia, and 6 per cent. of
arcotine, the consistence of the drug being
7. With respect to the last specimen, Dr.
'Shaughnessy mentions that the poppies which
roduced it were irrigated three times during the
eason, and that no manure was employed upon
e soil. It is much to be regretted that these
teresting results were not coupled with an
alysis of the soils from which the specimens
ere produced, for to chemical variations in it
ust be attributed the widely different results
corded above.

Opium as a medicine has been used from
e earliest ages; but when it was first re-
rted to as a luxury, it is impossible to
ate, though it is not at all improbable
at this was coeval with its employment in
edicine, for how often do we find that,
om having been first administered as
sedative for pain, it has been continued until
has taken the place of the evil. Such must
ve happened from the earliest ages, as it
ppens daily in the present; but as a national
ce it was not known until the spread of Maho-
edanism, when, by the tenets of that Prophet,
ine and fermented liquors being prohibited, it
me in their stead along with the bang or haseh-
sh (made from hemp), coffee, and tobacco.
om the Arabs the inhabitants of the Eastern
rchipelago most probably imbibed their predi-
ction for opium, although their particular
nner of using it has evidently been derived
m the Chinese. China, where at present it
so extensively used, cannot be said to have
lulged long in the vice. Previous to 1767
number of chests imported did not exceed
0 yearly; now the average is 50,000 to
,000. In 1773 the East India Company
de their first venture in opium, and in 1796
was declared a crime to smoke opium. In
ferent countries we find opium consumed in
ferent ways. In England it is either used in
olid state, made into pills, or a tincture in the
pe of laudanum. Insidiously it is given to
ldren under a variety of quack forms, such as
odfrey's cordial," &c. In India the pure opium is either dissolved in water and so used, or rolled into pills. It is there a common Native practice to give it to children when very young, by mothers, who require to work and cannot at the same time nurse their offspring. In China it is either smoked or swallowed in the shape of *Tye.* In Bally it is first adulterated with China paper, and then rolled up with the fibres of a particular kind of plantain. It is then inserted into a hole made at the end of a small bamboo, and smoked. In Java and Sumatra it is often mixed with sugar and the ripe fruit of the plantain. In Turkey it is usually taken in pills, and those who do so, avoid drinking any water after swallowing them, as this is said to produce violent colics; but to make it more palatable, it is sometimes mixed with syrups or thickened juices; in this form, however, it is less intoxicating, and resembles mead. It is then taken with a spoon, or is dried in small cakes, with the words "Ma-sha-Allah," imprinted on them. When the dose of two or three drachms a day no longer produces the beatific intoxication, so eagerly sought by the opiophagi, they mix the opium with other drugs. It then acts as a stimulant. In addition to its being used in the shape of pills, it is frequently mixed with hellebore and hemp, and forms a mixture known by the name of majoon, whose properties are different from that of opium, and may account in a great measure for the want of similitude in the effect of the drug on the Turk and the Chinese. In Singapore and China the refuse of the chandu, the prepared extract of opium, is all used by the lower classes. This extract, when consumed, leaves a refuse, consisting of charcoal, empyreumatic oil, some of the salts of opium, and a part of the chandu not consumed. Now one ounce of chandu gives nearly half an ounce of this refuse, called Tye, or Tineo. This is smoked and swallowed by the poorer classes, who only pay half the price of chandu for it. When smoked it yields a further refuse called sam shing, and this is even used by the still poorer, although it contains a very small quantity of the narcotic principle. Sam shing, however, is never smoked, as it cannot furnish any smoke, but is swallowed, and that not unfrequently mixed with arrack.

Preparation of Opium in India.—Towards the end of March when the plant is nearly ripe the bleeding of the capsules takes place. This operation is performed in the evening, and consists of tracing four parallel lines with a sharp knife or shell, penetrating the epicarp and sarcocarp of the capsule; a milky juice immediately exudes and its flow is promoted by the deposition of dew during the night; each set of incisions yields on an average one grain of opium. This is removed the ensuing morning, and the incisions repeated as long as any milk flows. The whole of the opium collected daily, and which is necessarily mingled with variable proportions of dew, is mixed together in earthen or wooden vessels. Should the quantity of dew have been excessive, a partial solution of the opium occurs, and an exudation of drops of a black, shining liquid (Pasewa) occurs, on the surface of the opium. This pasewa contains many of the active principles of the drug, and should be mixed with it again to secure the uniform power of the mass. The proportion of pasewa is often much increased by the fraudulent admixture of water by the growers, in hope of having their opium purchased by the gross weight. When brought to the factories the opium is usually of the consistence of 64 to 68, that is, containing that proportion of solid matter per 100. It is then placed in large tanks of brick work, or in wooden vats, with the upper surface exposed to the air. From these reservoirs, portions are daily removed and exposed on wooden trays three inches deep by four feet long and two broad; evaporation takes place under such circumstances with tolerable rapidity, and the opium eventually reaches the consistence of 70—the standard of the factory for the Chinese investment. The degree of inspissation is estimated on the purchase of the drug, as well as during its subsequent evaporation, by drying average portions of 100 grains each, on a metallic table heated to 208° by steam. A sufficient quantity of opium, average quality, is permitted to attain the consistence of 80°, and in that state is issued under the name of "Abkaree" to the licensed dealers of the bazars. Lastly, the finest opium which can be procured is set apart for medical purposes, and allowed to lose by evapoaation nearly the entire of its water. The *Chinese investement opium* is of a rich chesnut colour, translucent at the edges of thin masses, tears into portions with ragged margins; its structure is granular, its taste hot and bitter, its smell rich, peculiar, and agreeable; if a small portion be rubbed between the finger and thumb for a few seconds, it draws out into long colourless threads, and from the number, fineness, and tenacity of these threads the Chinese form their first estimate of the value of the drug. The *abkaree*, or Bengal bazar opium is more solid than the Chinese investment drug, of a darker colour, and often of a heavy ascescent smell. For the Chinese investment the opium is made into cakes, each containing 4 lbs., and enveloped in a case made of the petals of the poppy, and agglutinated with a paste made of opium and water, (Lewa). The abkaree opium is also vended in balls weighing 2lbs. covered by strips of a coarse kind of silk cemented by a mucilage of gum. The medicinal opium is solid, brittle in the cold season, of a brown colour, and fine smell. The medicinal drug is packed with great care in 4lb. and 2lb. squares, covered with layers of talc, and further defended by a case of brown wax ½ an inch in thickness. Besides the above, several kinds of opium are to be met with even in Indian commerce—that from Malwah demands most attention.

Malwah opium.—There are many varieties of this opium, some of which the Bengal Committee who investigated the drugs, had oportunities of examining through the kindness of Dr. Morehead of Bombay. The specimens were (average) 1½lb. in weight, hard, brittle, containing from five to ten per cent. of moisture, mixed with fragments of leaves and seeds, and impregnated with oil, apparently used in the collection; the colour was almost a rusty brown, the odour very powerful, and taste intensely bitter and lasting. Besides the opiums above mentioned, it is necessary to notice the chief varieties alluded to in works on European Materia Medica. *M. Berthemot*, in a paper published in the "Journal de Pharmacie," for September 1838, describes three principal kinds, viz.—1st. the opium of Alexandria; 2d. of Constantinople; 3rd. of Smyrna.

Alexandrian opium is in small, very dry, pieces, enveloped in fragments of leaves, o a very deep brown colour, clean and shining fracture, of faintly virose smell.

Constantinople, variety is in two forms, usually in flattened morsels contained in large leaves sometimes rather soft, occasionally dry and brittle softening between the fingers, and translucen when pressed into thin layers. The smell is stronger than that of the former kind, and is deemed sufficient distinguishing sign between both.

Symrna opium, lastly, is either in flat pieces or roundish balls; one kind is very dry, wrapped up in large leaves, of shining fracture reddish brown colour internally, of bitter, acrid and enduring taste. The second kind is rolled in seeds of the Rumex, is soft, and easily torn, o fawn colour internally, but darkens rapidl on exposure to the air, transparent whe drawn out, and often mixed with the seed which constitute its outer covering. The Smyr na opium is the most valuable of the varie ties now described, containing the largest pro portion of the narcotic alkali morphia, and in state which permits this principle to be purifie with greatest ease.—*O'Shaughnessy, p.* 172-174

Preparation in Asia Minor.—Men, women and children, a few days after the flower fall from the poppies, proceed to the fields, and wit a shell scratch the capsules, wait twenty-fou hours, and collect the tears, which amount t two or three grains in weight from each capsul These being collected and mixed with the scraping of the shells, worked up with saliva and surroun ed by dried leaves, it is then sold, but, generall speaking, not without being still more adulterat ed with cow's dung, sand, gravel, the petals c flowers, &c. Different kinds of opium are know in the markets of Europe and Asia.

The first in point of quality is the *Smyrna*, known in commerce as the *Turkey* or *Levant*. It occurs in irregular, rounded, flattened masses, seldom exceeding two pounds in weight, and surrounded by leaves of a kind of sorrel ; the quantity of morphia said to be derived from average specimens is eight per cent.

Second, *Constantinople Opium*, two kinds of which are found in the market, one in very voluminous irregular cakes, which are flattened like the Smyrna; this a good quality. The other kind is in small, flattened, regular cakes, from two to two and a half inches in diameter, and covered with the leaves of the poppy ; the quantity of morphia is very uncertain in this description of opium, sometimes mounting as high as 15 per cent., and sometimes descending so low as six, showing the great variety in the quality of the drug.

Third, *Egyptian Opium*, occurs in round flattened cakes, about 3 inches in diameter, and covered externally with the vestiges of some leaf. It is distinguished from the others by its reddish color, resembling "Socotrine Aloes." The quantity of morphia in this is inferior to the preceding. It has one quality which, when adulterated, ought to be known, that is a musty smell. By keeping it does not blacken like the other kinds.

Fourth, *English Opium*, is in flat cakes or balls enveloped in leaves. It resembles fine Egyptian opium more than any other kind. Its color is that of hepatic aloes, and in the quantity of morphia it is inferior to the preceding, but in the strength of the mass it is said by one of its most extensive cultivators to be superior.

Fifth, *French*, and sixth *German Opium*, require no particular remarks.

By a recent notice, the French are cultivating the poppy in Algeria, from which they get opium giving a small per centage of morphia.

Seventh, *Trebizond* or *Persian Opium*, is sometimes met with of a very inferior quality in the form of cylindrical sticks, which by pressure have become angular.

Eighth, *Indian Opium*, divided into four kinds, Cutch, Malwa, Patna and Benares. Of these *Cutch* is but little known or cultivated. It occurs in small cakes covered with leaves, and its color is much inferior to Smyrna. *Malwa* opium is to be met with of two kinds. The inferior is in flattened cakes, without any external covering, dull, opaque, blackish brown externally, internally somewhat darker, and soft. Its color is somewhat like the Smyrna, but less powerful, and with a slight smoky smell. Superior Malwa is in square cakes, about three inches in length and one inch thick. It has the appearance of a well prepared, shining, dry, pharmaceutical extract; its color is blackish brown, its odor less powerful than Smyrna; it is not covered by petals as the following kinds are, but smeared with oil; it is then rubbed with pounded petals. The *Behar*, *Patna*, and *Benares* Opium, being strictly in the hands of Government, no adulteration can take place, without a most extensive system of fraud; but it will not be uninteresting to trace the progress of the opium from the hands of the natives, to the condition in which it is delivered to the public by the Government. From the commencement of the hot season to the middle of the rains the Government is ready to receive opium, which is brought by the natives every morning, in batches, varying in quantities from twenty seers to a maund. The examining officer into each jar thrusts his examining rod, which consists of a slit bamboo, and, by experience, he can so judge of the qualities of the specimens before him, which are sorted into lots of No. 1 to No. 4 quality. Opium of the first quality is of a fine chesnut color, aromatic smell, and dense consistence. It is moderately ductile, and, when the mass is torn, breaks with a deeply notched fracture, with sharp needle-like fibres, translucent and ruby red at the edges. It is readily broken down under water, and the solution at first filters of a sherry color, which darkens as the process proceeds. One hundred grains of this yield an extract to cold distilled water of from 35 to 45, and at the temperature of 212 degs., leaves from 20 to 28 per cent., having a consistency of 70 to 72, the consistence of the factory. The second quality is inferior to the first, and the third quality is possessed of the following properties, black paste, of a very heavy smell, drops from the examining rod, gives off from 40 to 50 per cent. of moisture, and contains a large quantity of "Pasewa ;" while the fourth or last number embraces all the kinds which are too bad to be used in the composition of the balls; comprising specimens of all varieties of color and consistence. This number is mixed with water, and only used as a paste to cement the covering of the balls. The three first qualities are emptied from their jars into large tanks, in which they are kept until the supply of the season has been obtained. The opium is then removed and exposed to the air on shallow wooden frames, until it becomes of the consistency of from 69 to 70, when it is given to the cake maker, who guesses to a drachm the exact weight, and envelops the opium in its covering of petals, cemented by a covering of quality number 4. The balls are then weighed and stored, to undergo a thorough ventilation and drying. Formerly the covering of the balls was composed of the leaves of tobacco ; but the late Mr. Flemming introduced the practice of using the petals of the poppy, which was such an improvement that the Court of Directors presented him with 50,000 rupees. The balls, forty in number, are packed in a mango wood case, which consists of two stories with twenty pigeon holes in each, lined with lath and surrounded by the dried leaves of the poppy. Sometimes these balls are so soft as to burst their skins, and much of the liquid opium running out, is lost. In 1823 many of the chests of Patna lost five catties from this cause, and to this day we have the same thing continuing to occur. Patna chests are covered with bullock hides, Benares with gunnies. Dr. Impey, who resided in Malwa from 1843 to 1846, published at Bombay, in 1848, a valuable treatise on the cultivation, preparation, and adulteration of Malwa opium. It was some time before he obtained permission to publish the result of the experience he had acquired in Malwa, and as Government inspector of opium at Bombay. It is the most practical treatise Mr. Simmonds had met with, although a very elaborate, useful paper, by Mr. Little, surgeon, of Singapore,, appears in the 2nd vol. of the "Journal of the Indian Archipelago," from which I have quoted the preceding remarks. Mr. Little furnishes a complete history of the drug, and the physical and mental effects resulting from its habitual use. There are also some able remarks in Dr. O'Shaughnessy's Bengal Dispensatory:—For the successful cultivation of opium, a mild climate, plentiful irrigation, a rich soil, and diligent husbandry, are indispensable. In reference to the first of these, Malwa is placed most favorably. The country is in general from 1,300 to 2,000 feet above the level of the sea: the mean temperature is moderate, and range of the thermometer small. Opium is always cultivated in ground near a tank or running stream, so as to be insured at all times of an abundant supply of water. The rich black loam, supposed to be produced by the decomposition of trap, and known by the name of cotton soil, is that prepared for opium. Though fertile and rich enough to produce thirty successive crops of wheat without following, it is not sufficiently rich for the growth of the poppy until largely supplied with manure. There is, in fact, no crop known to the agriculturist, unless sugar cane, that requires so much care and labor as the poppy. The ground is first four times ploughed on four successive days, then carefully harrowed; when manure, at the rate of from eight to ten cart loads an acre, is applied to it; this is scarcely half what is allowed a turnip crop at home. The crop is after this watered once every eight or ten days, the total number of waterings never exceeding nine in all. One begah takes two days to soak thoroughly in the cold weather, and four as the hot season approaches. Water applied after the petals drop from the flower, causes the whole to wither and decay. When the plants are six inches high, they are weeded and thinned, leaving about a foot and a-half betwixt each plant; in three months they reach maturity, and are then about four feet in height if well cultivated. The full-grown seed-pod measures three and a-half inches vertically, and two and a-half in horizontal diameter.

Early in February and March the bleeding process commences. Three small lancet-shaped pieces of iron are bound together with cotton, about one-twelfth of an inch of the blade alone protruding, so that no discretion as to the depth of the wound to be inflicted shall be left to the operator; and this is drawn sharply up from the top of the stalk at the base, to the summit of the pod. The sets of the people are so arranged that each plant is bled all over once every three or four days, the bleedings being three or four times repeated on each plant. This operation always begins to be performed about three or four o'clock in the afternoon, the hottest part of the day. The juice appears almost immediately on the wound being inflicted, in the shape of a thick gummy milk, which is thickly covered with a brownish pellicle. The exudation is greatest over night, when the incisions are washed and kept open by the dew. The opium thus derived is scraped off next morning, with a blunt iron tool resembling a cleaver in miniature. Here the work of adulteration begins—the scraper being passed heavily over the seed-pod, so as to carry with it a considerable portion of the beard, or pubescence, which contaminates the drug and increases its apparent quantity. The work of scraping begins at dawn, and must be continued till ten o'clock; during this time a workman will collect seven or eight ounces of what is called "chick." The drug is next thrown into an earthen vessel, and covered over or drowned in linseed oil, at the rate of two parts of oil to one of chick, so as to prevent evaporation. This is the second process of adulteration—the ryot desiring to sell the drug as much drenched with oil as possible, the retailers at the same time refusing to purchase that which is thinner than half dried glue. One acre of well cultivated ground will yield from 70 to 100 pounds of chick. The price of chick varies from three to six rupees a pound so that an acre will yield from 200 to 600 rupees worth of opium at one crop. Three pounds of chick will produce about two pounds of opium, from the third to a fifth of the weight being lost in evaporation. It now passes into the hands of the Bunniah, who prepares it and brings it to market. From twenty-five to fifty pounds having been collected, is tied up in parcels in double bags of sheeting cloth, which are suspended from the ceilings so as to avoid air and light, while the spare linseed oil is allowed to drop through. This operation is completed in a week or ten days, but the bags are allowed to remain for a month or six weeks, during which period the last of the oil that can be separated comes away; the rest probably absorbs oxygen and becomes thicker, as in paint. This process occupies from April to June or July, when the rain begins. The bags are next taken down and their contents carefully emptied into large vats from ten to fifteen feet in diameter, and six or eight inches thick. Here it is mixed together and worked up with the hands five or six hours, until it has acquired an uniform color and consistence throughout, become tough and capable of being formed into masses. This process is peculiar to Malwa. It is now made up into balls of from eight to ten ounces each, these being thrown, as formed, into a basket full of the chaff of the seed pods. It is next spread out on ground previously covered with leaves and stalks of the poppy; here it remains for a week or so, when it is turned over and left further to consolidate, until hard enough to bear packing. It is ready for weighing in October or November, and is then sent to market. It is next packed in chests of 150 cakes, the total cost of the drug at the place of production being about fourteen rupees per chest, including all expenses. About 20,000 chests are annually sent from Malwa, at a prime cost charge of two lacs and eighty thousand rupees. It may easily be supposed that manipulations so numerous, complex, and tedious, as those described, give the most ample opportunities for the adulteration to which the nature of the drug tempts the fraudulant dealer.

In order to enable the cultivator to carry on his agricultural operations, he receives from time to time certain advances, the amount of which reaches in the aggregate to about one-half of the value of the estimated out-turn of produce. If the land has been under cultivation in previous seasons, its average produce is known; if it be new land, and considered by the Sub-Deputy Agent as eligible, then the cultivator, in addition to the usual advances, receives an advance of so much per biggah to enable him to bestow a certain amount of extra care in tilling and dressing the soil. The first advance is made on the completion of the agreement or bundobust, and this takes place in September and October. The second advance is made on the completion of the sowings in November, and the final or Chook payment is made immediately after the delivery and weighing of he produce. Nothing therefore can be fairer, o the cultivator than this system of advances; c is subject to no sort of exaction, in the hape of interest or commission on the money which he receives, and it puts within his power the certain means of making a fair pro-t by the excereise of common care and ho-esty. It is an established rule in the Agen-y that the cultivator's accounts of one season hall be definitively settled before the commencement of the next, and that no outstanding alances shall remain over. When a cultivator as from fraud neglected to bring produce to over his advances, the balances due by him are t once recovered, if necessary by legal means; whereas, if he can satisfactorily show that he has become a defaulter from calamity and uncontrollable circumstances, and that the liquidation of his debt is placed entirely beyond his power, his case is then made the subject of report to the Government by the Agent, with the request that the debt may be written off to profit and loss. These provisions are most wise, for outstanding balances may be made the means of oppression, and to their operation, may be traced a considerable amount of litigation and agrarian crime in the indigo districts of lower Bengal. It is clear that when such balances become so large that the cultivator cannot discharge them, he is no longer a free agent, but is perfectly subservient to the will of his creditor, for whom he must cultivate whether he desire it or not. Such burdens may even be handed down from father to son. The fairness of the Agency system, and the justice with which the cultivators are treated are best evidenced by the readiness with which they come forward to cultivate, and also by the comparative rarity of agrarian crime, arising out of matters connected with the poppy cultivation. Opium is grown to some extent in Egypt; 39,875 lbs. were produced in 1831, and sold at two dollars a pound. At the end of October, after the withdrawal of the Nile waters the seed, mixed with a portion of pulverised earth is sown in a strong soil, in furrows; after fifteen days the plant springs up and in two months has the thickness of a Turkish pipe, and a height of four feet; the stalk is covered with long, oval leaves, and the fruit, which is greenish, resembles small orange. Every morning before sunrise, in its progress to maturity, small incisions are made in the sides of the fruit, from which a white liquor distils almost immediately, which is collected in a vessel; it soon becomes black and thickish, and is rolled into balls, which are covered with the washed leaves of the plant; in this state it is sold. The seeds are crushed for lamp oil, and the plant is used for fuel.—*O'Shaughnessy*, 589. Dr. Royle tells us that Opium seems to have been known from early times. Hippocrates is supposed to have employed it, and Diagoras condemned its use in affections of the eyes and in ear-ache. Dioscorides describes it: but opium does not appear to have been much employed until the time of the Arabs, except in the form of the confections called Mithridatica, Theriaca, and Philonium. The Arabic name *afioon*, the Hindu *ephim*, and the name *afooyung*, by which it is known in China, must all have proceeded from the original Greek name, which is itself derived from *οπος*, juice. The Sanscrit *apoynum* seems to have a similar origin. Opium is obtained by a very simple process, consisting merely in making incisions in the evening into the capsules of the Poppy, shortly after the petals fall off, taking care not to penetrate into the interior, when a milky juice exudes, and either concretes upon the capsule, whence it may be taken off in little tear-like masses, or earlier in the morning in a softer state. Upon this will depend whether the grains run together, or remain separate even when pressed. When thus collected, they require nothing more than being dried in a warm and airy room, when the opium becomes of a brown colour, with a shining fracture, and has a strong and peculiar odour. Some opium which Dr. Royle prepared in this manner in the Saharunpoor Botanic Garden in 1828-29, was pronounced by the Medical Board of Bengal to be like Turkey opium. Most of the opium made in the Himalayan mountains is similarly prepared, and is of very fine quality. Belon and Olivier describe the Opium of Asia Minor as formed by the assemblage of the small tears collected off the capsules. Dioscorides, however, describes the process as consisting in making incisions into the capsules when the dew has evaporated, collecting the juice in a shell, mixing the several portions, and rubbing them up in a mortar. Kaempfer gives this as the Persian process, and M. Texier describes it as being adopted in Asia Minor; and it is certainly practised with the immense quantities collected in India in the provinces of Behar and Benares, and of which an excellent description has been given by Dr. Butter in the Journal of the Asiatic Society, v. p. 136. When this method is adopted, the mass will appear homogeneous; when it is omitted, it will appear to be composed of agglutinated tears. Both appearances may be observed in the opium of commerce. Dr. Butter describes the quantity of opium from each capsule as varying according to soil, irrigation, and to the quantity of dew which falls, but averaging about 1 gr. from each quadruple incision. The tears are of a reddish-white colour externally but semi-fluid in the interior, and of a reddish-white colour. The juice is apt to be mixed with dew, and fraudulently with a little water, and will separate into a fluid portion (*passewa*) and into one which is more consistent, the former containing much the largest portion of the Bimeconate of Morphia. The whole of the day's collection is rubbed together in a mortar, so as to break down the grains, and reduce the whole to a homogeneous semi-fluid mass, which should be dried as quickly as possible in the shade, when it is called *pucka* or matured, being called *raw* in its former state. All samples of Opium brought for sale are submitted to a steam drying process, by which the quantity of fluid in each is easily ascertained. The Opium for the China investment contains about 30 per cent, of moisture: that for medical use in India is made quite dry. The Opiums known in European commerce have been described under the following heads by Prof. Guilbourt. That collected in Asia Minor, chiefly in Anatolia, is generally all included under the head of Turkey Opium, and most of it is exported from Smyrna; some of it, however, is taken to Constantinople, whence it is re-exported to other parts of Europe. Some Egyptian is imported into this country. The Persian is only known. The Indian kinds are exported to China.

Smyrna Opium, called also Levant Opium, is generally in flattened masses, and, in consequence of its original softness, without any definite regular form; weighing from a half to two pounds and covered with the capsules of a species of Rumex. It is at first soft, of a distinct brown colour, becoming blackish and hard when dried, losing weight from evaporation of water, having the strong and peculiar odour of Opium. "When examined with a magnifier, it is seen to be composed of yellowish agglutinated tears." This is the purest kind of Opium, yielding about 8 per cent. of Morphia and 4 per cent. of Narcotine, and, on an average, about 12 per cent. of Hydrochlorate of Morphia. An inferior kind is, however, also imported from Smyrna, which is more apt to be adulterated, is harder, of a darker colour, appears homogeneous, and may be seen covered either with Rumex capsules, or with the leaves of the Poppy. The Smyrna Opium is produced at several places, at from 10 to 30 days' distance in the interior; but that grown at Caisar, about 60 miles from Smyrna, is the most esteemed for its cleanness and good quality. Mr. Hamilton states that much is produced at Bogaditza: it is made into lumps about four or five inches in diameter, round which leaves are wrapped.

Constantinople Opium, M. Guibourt conceives, may be collected in the northern parts of Anatolia. One kind is in small lenticular pieces about two inches in diameter, weighing from four to eight ounces, and always covered with a Poppy-leaf, of the midrib of which the mark may be seen on the middle of the pieces of Opium. Another variety is in large irregular cakes. Both are more mucilaginous than the Smyrna kind, and, though of good quality, the Constantinople is less uniform in the quantity of Morphia it contains, some yielding less, and others as much as, the best kinds of Opium.

Egyptian Opium is in flattened roundish cakes about three inches in diameter and covered with the remains of some leaf which M. Guibourt was unable to distinguish. It looks well externally, is homogeneous, has something of a reddish hue, not blackening by keeping, but softening on exposure to the air, and has somewhat of a musty smell. It is generally inferior, and Mr. Guibourt obtained only $\frac{3}{7}$ of the Morphia yielded by Smyrna Opium.

Persian Opium, which Dr. Pereira calls Trebizond Opium, from his specimens having been obtained from thence. The specimens in the King's College Museum were sent by Mr. Morson, to whom M. Guibourt was also indebted. This kind is of a black colour, apparently homogeneous in texture, and in sticks some inches in length, each wrapped up in a separate piece of paper, and tied with a piece of cotton. Some Opium has been collected in Algiers. A new variety imported from Turkey has been described by Mr. Morson (P. J. iv. 503). It resembled the Constantinople, but was soft and light-coloured; contained much wax, caoutchouc, and about 6½ per cent. of Morphia. Besides these, some Opium is occasionally met with of European manufacture; and it might easily be produced in England if the summer was more regular. In the south of Europe the summer is probably too hot and dry. In India it can only be cultivated in the cold weather. Some good English Opium has been produced, but it is irregular in strength. The quantity of Morphia said to have been obtained from some specimens of French and of German Opium is enormous,—being from 16 to 20 per cent.

Indian Opium, not being known in European commerce, requires a very short notice. The *Saharunpoor Garden Opium*, sent home in 1844, is of a brown colour, shining fracture, with the strong and peculiar smell of opium, and yielded the late Professor Daniell, in one of the last analyses he made previous to his sudden and lamented death, 8 per cent. of Morphia. [Some specimens of this opium, prepared when Dr. Royle was superintendant of the Saharunpore Botanic Garden, sent to the Medical Board of Bengal in 1829, were pronounced to be " very fine specimens, and to resemble Captain Jeremie's in almost every particular," and Captain Jeremie's they " considered equal, if not superior, to the finest Turkey opium that comes into the market at home."

Himalayan Opium possesses similar sensible properties and though liable to be adulterated, is when pure, of very fine quality.

Malwa Opium is in flat circular cakes, average weight 1½. lb., of a rusty-brown colour, strong odour, and bitter permanent taste, varying much in quality. Some Malwa Opium lately analysed yielded only 2 per cent. of Morphia, was oily and mucilaginous, and appeared to have been obtained by expression of the capsules. Dr. Smyttan, late Opium Inspector at Bombay, obtained from 3 to 5 per cent. of Morphia from some varieties, and from 7¼ to 8 per cent. from finer kinds Some *Kandeish Opium* yielded to Mr. E. Solly 72 per cent. of soluble matter, and about 7 per cent. of Morphia. The E. I. Company's Opium, which is that known under the name of Bengal Opium, and which is chiefly produced in the provinces of Behar and Benares, with some in that of Cawnpore, is also of different qualities : that intended for medicinal use in the hospitals in India is of very fine quality, of a brown colour, and fine smell, packed with great care in 4 lb. and 2 lb. squares covered with layers of talc, and further defended by a case of brown wax half an inch in thickness. This Dr. Jackson, lately Opium Inspector at Calcutta, informed Dr. Royle is the *Patna Garden Opium*, cultivated, prepared, and selected exclusively for the Dispensary, and that it yields about 7 to 8 per cent. and sometimes more (10½), of Morphia. It is of this kind that Dr. Christison says, " I have examined specimens little inferior to average Turkey Opium in the quantity of Morphia they contained."

Chinese Investment Opium, which is highly esteemed by the Chinese, is made into cakes or balls, each containing about 4 lbs. and covered with a thick layer of poppy petals, made to adhere to the opium and to each other by means of a mixture of inferior kinds of Opium and water. It is of a dark brown colour, of the consistence of an extract when first cut into, containing 70 per cent. of solid matter, and about 2½ per cent. of Morphia.—*Royle*. The E. I. Company grant licences for the cultivation of the poppy, and contract for all the produce at certain rates, varying with the quality. No opium can be grown without this licence, and an advance equal to about two-thirds of the value of the produce is made to the grower. This produce is made over to district collectors, who approximately fix the worth of the contents of each jar, and forward it to Patna, where rewards are given for the best samples, and the worst are condemned without payment; but all is turned to some account in the reduction of the drug to a state fit for market. The poppy, and the capsules are sliced in February and March with a little instrument like a saw, made of three iron plates with jagged edges, tied together. The cultivation is very carefully conducted, nor are there any very apparent means of improving this branch of commerce and revenue. During the N. W., or dry winds, the best opium is procured, the worst during moist, or E. and N. E., when the drug imbibes moisture, and a watery bad solution of opium collects in cavities of its substance, and is called Passewa, according to the absence of which the opium is generally prized.—*Hooker Him. Jour. Vol.* I *.p.* 83. At the end of March, he continues, the opium jars arrive at the stores by water and by land, and continue accumulating for some weeks. Every Jar is labelled and stowed in a proper place, separately tested with extreme accuracy, and valued. When the whole quantity has been received, the contents of all the jars are thrown into great vats, occupying a very large building whence the mass is distributed, to be made up into balls for the markets. This operation is carried on in a long paved room, where every man is ticketed, and many overseers are stationed to see that the work is properly conducted. Each workman sits on a stool, with a double stage and a tray before him. On the top stage is a tin basin containing opium sufficient for three balls; in the lower another basin holding water: in the tray stands a brass hemispherical cup, in which the ball is worked. To the man's right hand is another tray, with two compartments, one containing thin pancakes of poppy petals pressed together, the other a cupful of sticky opium-water, made from refuse opium. The man takes the brass cup, and places a pancake at the bottom, smears it with opium-water, and with many plies of the pancakes makes a coat for the opium. Of this he takes about one-third of the mass before him, puts it inside the petals, and agglutinates many other coats over it: the balls are then again weighed, and reduced or increased to a certain weight if necessary. At the day's end, each man takes his work to a rack with numbered compartments, and deposits it in that which answers to his own number, thence the balls (each being put in a clay cup) are carried to an enormous drying-room, where they are exposed in tiers, and constantly examined and turned, to prevent their being attacked by weevils, which are very prevalent during moist winds, little boys creeping along the racks all day long for this purpose. When dry, the balls are packed in two layers of six each in chests, with the stalks, dried leaves, and capsules of the plant, and sent down to Calcutta. A little opium is prepared of very fine quality for the Government Hospitals, and some for general sale in India; but the proportion is trifling, and such is made up into square cakes. A good workmen will prepare from thirty to fifty balls a day, the total produce being 10,000 to 12,000 a day; during one working season 1,353,000 balls are manufactured for the Chinese market alone.—*Hooker Him. Jour. Vol.* I. *p.* 83 & 84. The poppy-petal *pancakes*, each about a foot radius, are made in the fields by women, by the simple operation of pressing fresh petals together. They are brought in large baskets, and purchased at the commencement of the season. The liquor with which the pancakes are agglutinated together by the ball-maker, and worked into the ball, is merely inspissated opium water, the opium for which is derived from the condemned opium, (Passewa,) the washing of the utensils, and of the workmen, every one of whom is nightly laved before he leaves the establishment, and the water is inspissated. Thus not a particle of opium is lost. To encourage the farmers, the refuse stalks, leaves, and heads are bought up, to pack the balls with; but this is far from an economical plan, for it is difficult to keep the refuse from damp and insects.—*Hooker Him. Jour: Vol.* I. *p.* 85. A powerful smell of opium pervaded these vast buildings, which Dr. Corbett assured Dr. Hooker did not affect himself or the assistants. The men work ten hours a day, becoming sleepy in the afternoon; but this is only natural in the hot season: they are rather liable to eruptive diseases possibly engendered by the nature of their occupation.—*Hooker Him. Jour. Vol.* I. *p.* 85. Even the best East Indian opium is inferior to the Turkish, and owing to peculiarities of climate, will probably always be so. It never yields more than five per cent of morphia whence its inferiority, but is as good in other respects, and even richer in narcotine.—*Hooker Him. Jour. Vol.* I. *page* 85.

Cultivation.—The mode of raising the poppy in the Patna district in India, is thus described. "The ryot or cultivator having selected a piece of ground, always preferring (*cœteris paribus*) that which is nearest his house fences it in. He then, by repeated ploughings, makes it completely fine and remove all the weeds and grass. Next, he divides th field into two or more beds by small dikes o mould, running lengthwise and crosswise according to the slope and nature of the ground, and again into smaller squares by other dikes leading from the principal ones. A tank is dug about ten feet deep at one end of the field, from which by a leathern bucket, water is raised into one o the principal dikes and carried to every part a required; this irrigation is necessary because th cultivation is carried on in the dry weather. Th seed is sown in November, and the juice collecte in February and March, during a perio usually, of about six weeks; weeding and watering commence as soon as the plants spring u and are continued till the poppies come t maturity. Cuts are then made in the rin of the seed vessel, with a small shell; fro them the juice exudes during the night an is scraped off in the morning; when the head are exhausted, they become whitish.—*William Middle kingdom, Vol.* II. *page* 383. This writ seems to exaggerate matters. In his bias h says: the cultivator is assisted by his famil and must deliver a certain quantity at suc a price to the collector, the amount bein fixed by a survey of the field when in bloom he receives about 165 dollars for a see (1 lb. 13 oz.) of the poppy juice, which must b of a certain consistence The ryot has, in mos cases, already received the advance money fo the opium, and if he sell it to any other than th collector, or if he fail to deliver the estimate quantity, and there is reason for supposing h has embezzled it, he is liable to punishmen In all the territories belonging to the compa ny, the cultivation of the poppy, the prepa ration of the drug, and the traffic in it unt it is sold at auction for exportation, are un der a strict monopoly. Should an individu al undertake the cultivation without havin entered into engagements with the governmen to deliver the produce at the fixed rate, h property would be immediately attached, and h compelled either to destroy the poppies, or gi security for the faithful delivery of the product. The cultivation of the plant is compulsory, for if the ryot refuse the advance for the year's crop the simple plan of throwing the rupees into his house is adopted; should he attempt to abscond, the agents seize him, tie the advance up in his clothes, and push him into his house. There being then no remedy he applies himself as he may to the fulfilment of his contract. Vast tracts of the very best land in Benares, Bahar, and elsewhere in the northern and central parts of India, are now covered with poppies; and other plants used for food or clothing, grown from time immemorial, have nearly been driven out. In Turkey, Persia, India and China, many myriads of acres and millions of people are employed in the cultivation of poppies. [Note Chinese Repository. Vol. V., page 472.] *Williams' Middle kingdom, Vol. II. p.* 383. There are four sorts of opium brought to China: Turkey, which sells cheapest in China, and is brought chiefly from Smyrna; Patna and Benares, which are grown in the Company's territories, and sold at Calcutta; and Malwa, which is cultivated out of their jurisdiction, but pays them a revenue of about 200 rupees each chest for its transit to Bombay where it is shipped. The Portuguese also export a small quantity from their settlement in Damaun. The drug is rolled in balls, and then packed in strong boxes weighing from 16 lbs. for Patna to 134 lbs: or 140 lbs. for Malwa. The Malwa opium is grown and prepared entirely by natives, and is often so extensively adulterated as to be worthless. There are between 400 and 500 cakes in a chest of Malwa, and the cultivator there receives double the wages of the ryot in Bengal.—*Williams' Middle Kingdom, Vol.* II. *p.* 385. The chests of Patna and Benares are made of mango wood, and consists f two stories or parts, in each of which there re twenty partitions; the forty balls to fill these artitions are carefully rolled in dried poppy eaves. The chest is covered with hides or gun-y bags, and the seams closed so as to render it s impervious to the air as possible, but consi-erable allowance is made for dry gage. After the rug is sold at Calcutta, it is shipped in small ists ailing vessels for China, more than half of he export from that and other parts in India eing sent off in these clippers.—*Williams' Mid-le Kingdom, Vol.* II. *p.* 385.

Effects of Opium-smoking.—The vice of opium-moking is now so prevalent in Calcutta, not only mong the Chinese, but the degraded, and de-raved of every sect and nation, that Dr. 'Shaughnessy had many opportunities of wit-essing the results to which it leads. Stupor, verie, and voluptuous listlessness are the im-ediate effects produced. In this state the dividual can be at once and easily aroused to xertion or business. No sickness, constipation, or any other functional disturbance supervenes on each indulgence; gradually, however, the appetite diminishes, the bowels become irregular, emaciation takes place, sexual tendencies are destroyed, and premature old age speedily comes on. This he admits is an extreme case; when the habit is but moderately followed it appears to occasion no greater evil than the proportionate indulgence in wine or other spirituous liquors.—*O'Shaughnessy, page* 180. Opium, is at present, largely consumed in the Malayan islands, in China, in the Indo-Chinese countries, and in a few parts of Hindustan, much in the same way in which wine, ardent spirits, malt liquor, and cider, are consumed in Europe. Its deleterious character has been much insisted on, but, generally, by parties who have had no experience of its effects. Like any other narcotic or stimulant, the habitual use of it is amenable to abuse, and as being more seductive than other stimulants, perhaps more so; but this is certainly the utmost that can be safely charged to it. Thousands consume it without any pernicious result, as thousands do wine and spirits, without any evil consequence. I know of no person of long experience and competent judgment who has not come to this common-sense conclusion. Dr. Oxley, a physician and naturalist of eminence, and who has had a longer experience than any other man of Singapore, where there is the highest rate of consumption of the drug, gives the following opinion: "The inordinate use, or rather abuse, of the drug most decidedly does bring on early decrepitude, loss of appetite, and a morbid state of all the secretions; but I have seen a man who had used the drug for fifty years in moderation, without any evil effects; and one man I recollected in Malacca who had so used it, was upwards of eighty. Several in the habit of smoking it have assured me that, in moderation, it neither impaired the functions nor shortened life; at the same time fully admitting the deleterious effects of too much." There is not a word of this that would not be equally true of the use and abuse of ardent spirit, wine, and, perhaps even of Tobacco. The historian of Sumatra, whose experience and good sense cannot be questioned, came early to the very same conclusion. The superior curative virtues of opium over any other stimulant are undeniable, and the question of its superiority over ardent spirits, appears to me to have been for ever set at rest by the high authority of Sir Benjamin Brodie. "The effect of opium, when taken into the stomach," says this distinguished philosopher, "is not to stimulate but to soothe the nervous system. It may be otherwise in some instances, but these are rare exceptions to the general rule. The opium-eater is, in a passive state, satisfied with his own dreamy condition while under the influence of the drug.

He is useless but not mischievous. It is quite otherwise with alcoholic liquors.—*Psychological Inquiries, p*: 218. *Crawfurd Dict. page* 313. It may be worth while to show what is really the relative consumption in those countries in which its use is alleged to be most pernicious. In the British settlement of Singapore owing to the high rate of wages, and the prevalence of a Chinese population, the consumption is at the rate of about 330 grains, or adult doses, a year, for each person. In Java, where the Chinese do not compose above one in a hundred of the population, and where wages are comparatively low, it does not exceed 40 grains. Even in China itself where the consumption is supposed to be so large, it is no more than 140 grains chiefly owing to the poverty of the people, to whom it is for the most part inaccessible.—*Crawfurd Dictionary, page* 313. Opium is eaten to a very considerable extent by the Burmese, and the drug is easily procured.—*Mason.* That raised in Bahar (called Patna in commerce) and Benares is superior to the Malwa, and both are preferred by the Chinese to the Turkey opium. Good opium is moderately firm in texture, capable of receiving an impression from the finger; of a dark yellow color when held in the light, but nearly black in the mass, with a strong smell, and free from grittiness. That produced in different countries, however, varies considerably and experience alone can determine the best article. The value increases for a short time by age; but this soon ceases to be the case, and Turkey opium in particular deteriorates unless carefully preserved from the air. Opium is adulterated with leaves, dirt, and other substances; if very soft it is not usually good. The great consumption of this drug among the Chinese has made the opium trade a very important branch of commerce. About fourteen millions of dollars worth have been annually sold to them for many years past, and the demand is constant. The trade is now carried on by means of ships stationed at different points on the coast, to which the drug is carried in small vessels; or it is sold all along the coast in schooners from Haenan to Shanghae, especially at points opposite large towns. No efforts have been made by the Chinese authorities to suppress the traffic that deserve to be mentioned, since those of commissioner Lin in 1839, and it is now everywhere publicly smoked. It is probable that before long the progress of events will compel the Chinese to legalize the trade. The opium brought from India sells from $ 550 to $ 700 a chest, and the Turkey from $ 370 to $ 500 a pecul. The price of the commodity fluctuates, however, according to the extent of importation, and other causes. For minute information respecting the progress and effects of this traffic, see the Chinese Repository, *passim.* —*Morrison.* The extent to which the poppy is cultivated in China bears about as great a disproportion to the consumption of opium, as the growth of tea abroad does to its use; the provinces of Yunnan and Kwangsi are said to produce the greater part of the native article.—*Williams' Middle Kingdom, p.* 286.

Opium shipped to China from East India for following years is:—

	Bengal Opium. Chests.		Malwa Opium. Chests.
1820,	3,591		2,278
1830,	7,443		12,856
1835,	14,851		12,933
1840,	18,965		18,321
1845,	21,457		20,660
1846,	20,090		19,063
1847,	21,650		20,523
1848,	28,000		17,490
1849,	36,000		18,532

Bonynge America, page 170.

From London Home News Mail 10*th April* 1857,

Opium Receipts of the East India Company.—A return of the receipts and expenditure of the East India Company during the 10 years 1845-55, in respect of their opium monopoly, has been published, The net receipts were as follows:—

		RUPEES.	As.	P.
1845-46		1,98,82,577	8	7¼
1846-47		2,09,61,421	7	8
1847-48		1,74,51,890	6	8¾
1848-49		2,46,27,136	12	5¼
1849-50		2,51,83,494	15	1¼
1850-51		2,23,72,576	7	1
1851-52		2,74,47,805	8	1¼
1852-53		2,73,89,125	8	9
1853-54		2,32,44,991	6	0½
1854-55		2,18,74,489	12	6
		23,04,35,509	13	0¼
Average		2,30,43,550	15	8¼

Opium Adulterations.—Good Opium, when it has been sometime made, is of a dark brown or blackish colour externally, and of a reddish-brow internally, either homogeneous in texture, or formed of agglutinated tears. Sp: Gr: about 3·36. Th taste is strongly and permanently bitter, wit some degree of acridity, and a little aroma. Th odour is both powerful and peculiar. It is hard and even becomes brittle, and breaks with a com pact shining fracture, and produces a yellowish brown powder. Some kinds, however, are sof internally, and others never become entirely dry The London College, to preserve uniformit of strength, directs dried Opium only to b used for the several pharmaceutical preparations Opium is softened by the application of heat and burns at a higher temperature. The effect of the ordinary reagents are, that water, eithe temperate or warmed, dissolves about two-third of good opium, and forms a solution of most of its active principles, and is of a bitter taste and of a reddish-brown colour. Rectified Spirit takes up four fifths of the whole mass, including all the active properties of Opium. Ether dissolves much of what is left undissolved by water. Diluted acids take up all its active principles. The alkalis precipitate them from their solutions, but redissolve them when added in excess. They are also precipitated by baryta, lime, and magnesia, and their salts, also by the soluble salts of lead and of other metals, as well as by solutions of tannin and astringent vegetable substance. As some of these are apt to be prescribed with opium, it is essential to attend to the form of exhibition, for the precipitate may contain all the active principles, and the solution be inert ; or it may be made active again by using an excess of ammonia or potash ; or the active principle may be taken up by the acid of some of the salts used. But these various effects of reagents can be duly appreciated only when the composition of Opium is understood. Several analysis were made of Opium before any just ideas were obtained respecting its constitution. Derosne in 1803 first obtained a saline body. Serturner and Seguin, the first a Hanoverian, and the second a French apothecary, both discovered in 1804 another crystallizable substance, upon which subsequent experience has proved the narcotic power of opium to depend. In a second memoir of Serturner published in 1817, he announced his discovery of the existence of *morphia* combined with *meconic acid.* This was confirmed by Robiquet. Since then, Geiger, Beltz, Pelletier, Couerbe, Schmidtz, and Mulder, have successively analysed and shown Opium to consist of a variety of principles. Of these, three are alkaline, *Morphia*, *Codeia*, and *Paramorphia.* A fourth, *Narcotin*, though neutral to colours, forms salts with acids : of this a great portion is in a free state, and may at once be separated from Opium by ether ; the remainder, as well as the whole of the *Morphia* and *Codeia*, are in combination with the *Meconic* Acid and some *Sulphuric acid* found in Opium. Other bodies are also acid, as the *brown acid extractive*, the *resin*, and *oily matter.* Some are neutral, as *Narcein* and *Meconin.* Narcotin is sometimes enumerated among the neutral principles, and Thebaina, called also Paramorphia, though alkaline, does not combine with acids. Besides these, there is a trace of Volative Oil (the odorous principle ?), Gum, Bessorine, Albumen, Caoutchouc, Lignin, and Salts of inorganic bases. If adultered with

a. Water.—Heat 100 grs on a water bath for half an hour, the loss is water.

,, *b.* Starch, pease-meal, flour—boil 20 grs. with water, strain, allow to cool and tincture of iodine which gives a blue precipitate with these impurities.

,, *c.* Resins, dammar and clay,—subside as a harsh mass during the trituration of 100 grains in distilled water.

,, *d.* Catechu, Gab.—To solution "a" add a solution of isinglass, there is a copious precipitate.

,, *e.* Mucilaginous extracts of bel (fruit of Aegle marmelos) and mekanna, seeds of Euryale ferox—add alcohol to solution "a" previously concentrated to ¼th. A copious precipitate of gummy matter ensues, quite soluble in hot water.

,, *f.* The presence of datura, tobacco and bang can only be detected by the smell of the drug, which resembles that of a bad hookah.—*Ben. Ph.* 2, 8.

Dr. Royle says, Opium is of different degrees of value, according to its sensible properties, and the quantity of Morphia it contains ; but it is subject to adulterations. First it may be mixed up with too much water, either intentionally, or in consequence of the dew having been very heavy. The quantity may be ascertained by the loss on evaporation. The most injurious fraud is that of washing out the soluble and most valuable parts of Opium, and bringing the residual mass for sale. In this case Butler states the Opium loses its translucency and redness of colour, also its adhesiveness. Sand, clayey mud, sugar, molasses, cowdung, Datura-leaves, the glutinous juice of Ægle Marmelos, and even pounded poppy-seeds, are employed to adulterate Opium. Malwa Opium often contains oil and other matters obtained by the expression of the poppy-heads. Some Opiums from which Morphia has been extracted have been occasionally met with in European commerce. To be enabled to judge of good Opium, one must be well acquainted with the different varieties of Opium, their respective colours, tastes, and textures, as well as the natural degree of moisture, and see that no mechanical admixtures are apparent, nor left on a filter. Several methods have been proposed for ascertaining the quantity of Morphia in Opium, but none of them are very satisfactory. In the E. P. it is proposed to ascertain it by the weight of the precipitate caused in an infusion of Opium by Carbonate of Soda. "A solution of 100 grs. macerated 24 hours in Aq. f ℥ ij. filtered, and strongly squeezed in a cloth, if precipitated by a cold solution of Carbonate of Soda ℥ ſs. in two waters, and heated till the precipitate shrinks and fuses, will yield a solid mass on cooling, which weighs, when dry, at least 11 grains, and if pulverized, dissolves entirely in solution of Oxalic acid." Dr. Pereira has not found this satisfactory, but considers the process of Thibaumary as the best, in which Ammonia is employed to precipitate the Morphia in infusion of Opium. (v. Mat. Med.. p. 1742.) Dr. Christison considers Dr. Gregory's method of obtaining Muriate of Morphia as the only one; but it requires about a pound of Opium to be operated on which, if good, should not yield less than ten per cent. of a snow-white salt.

Action. Uses. Opium, applied *externally*, is at first stimulant, producing pain, as on the eye, and then sedative. When taken *internally*, in small doses, excitement is first produced, as apparent in the increased frequency of the pulse, and heat of the skin. This is soon followed by diminished sensibility, calmness, and sleep, with abatement of pain, suspension of mucous secretion, with the exception of that of the skin. But if the tendency to sleep be resisted, Opium, in moderate doses, and in those habituated to its use, in excessive doses, will produce intellectual excitement accompanied by bodily activity, soon to be followed by general debility, as is exemplified in Opium-eaters. In large doses, it is a narcotic poison. It is frequently employed as an anodyne and hyponotic, as a sedative, and to restrain inordinate discharges, as in diarrhœa and cholera, also as a diaphoretic, often as an antispasmodic, and even as a febrifuge. In Delirium Tremens it is beneficially given in large doses, and, combined with Calomel and sometimes with the addition of Ipecacuanha, even in inflammatory affections; though in general it is contraindicated when there is inflammation or much fever. It is no doubt the most important of all therapeutical agents, and that which is perhaps the most frequently employed.—*Royle.*

(5888) OPOBALSAM, Balm of Gilead, Judiacum de Mecca.

Akooyeela-semoon-i-roomic, Arab.
Balessan, Egypt.
Balsamier de la Meque, Fr.
Opobalsamo, It.
Roghun-i-Bulsan, Pers.

A liquid gum-resin, obtained from the *Amyris Gileadensis*, a tree found in Arabia, Abyssinia, and Syria. It is first turbid and white; of a pungent smell resembling turpentine, but sweeter; and of a bitter, acrid, astringent taste. When old it becomes thin, limpid, of a greenish hue, then of a golden yellow, and at length of the colour of honey. It is chiefly used as a cosmetic by the Turkish ladies.

(5889) OPOPONAX, a genus of Plants belonging to the natural order *Umbelliferæ*; it has an obsolete calyx, roundish entire petals rolled inwards, with a rather acute lobe; compressed fruit with a dilated convex border, bipinnate leaves with unequally cordate segments, crenated and obtuse. The umbels are compound; the involucre both universal and partial, and the flowers yellow.

(5890) OPOPONAX CHIRONIUM. *Syn.* Pastinaca Opoponax. Ferula op: πανακες ηραχλειον *Dioscor.*

(5891) OPOPONAX CHIRONUM, is native of the south of Europe and Asia Minor, on dry hills, margins of fields, and thickets. It is a plant 6 or 7 feet high, of a dull-yellowish colour, and resembling a parsnip. The stem is strongly furrowed; the leaves from 1 to 2 feet long, or more, flat, bipinnate, with ovate cordate leaflets, which are usually oblique at the base, often confluent, and surrounded by a cartilaginous, crenated border. The calyx is inconspicuous, the styles rather short and stout. Although this plant is a native of the south of Europe, the resinous gum which exudes from the stalk or root when wounded is brought from the Levant and East Indies in roundish drops of a reddish-yellow colour, with specks of white. It is supposed to be an emmenagogue, but it is seldom used; it is similar in its effects to assafœtida. This is a plant of easy culture, and may be propagated either by seeds or dividing at the root.—*Eng. Cyc.*

(5892) OPOPONAX.

Jawasheer, Arab.
Opopanax, Fr.
Panax gummi, Ger.
Jawasheer, Guz. Hind.
Opopo-nace, It.
Gawshier, Pers.
Opoponaca, Sp.

Off. Prod. Opoponax, gum resin obtained from the stalks of a tall plant (*Opoponax chironium*). According to Pelletier's analysis 100 parts contain—resin 42, gum 33, starch 4, extractive and malic acid 4, volatile oil 5, with traces of caoutchouc and wax, and 9 of woody fibre. The sp. gr. 1622; with water it forms a milky fluid. Opoponax is derived from ὀπος juice, παν all, and ἀχος a remedy, meaning that it is a remedy for all diseases! In action it resembles asafœtida, but is much feebler. The plant occurs in dry fields in the south of Europe and Asia Minor. A milky juice exudes from the root when wounded, and hardens into a fœtid gum resin, in most of its properties closely resembling asafœtida. The resin is found in all the Bazars of Bengal, and is even exported from this country to Europe.—*O'Shaughnessy*, *page* 361.

(5893) OPOSSUM. [Didelphina; Marsupiata.]

(5894) OPUNTIA, a genus of Plants belonging to the natural order *Cactacea.* In the gardens the species are called Indian Figs, and are remarkable for their stems consisting of flat joints, broader at the upper than the lower end, but which eventually lose that appearance, becoming both cylindrical and continuous. On one of them, *O. cochenillifera*, the cochineal insect is fed, and others yield a pleasant sub-acid fruit, which is eaten in hot countries. The lavas of Ætna are in some places covered with the spiny bushes of *O. vulgaris*, whose large purple juicy fruits are carried for sale to the neighbouring markets. It is however only a naturalised plant, its native country being South America within the tropics.—*Eng. Cyc.*

(5894) OPUNTIA TUNA, has been figured in Dillenius's 'Hortus Elthamensis,' tab. 380, and is the original of what Linnæus called *Cactus Tuna*; it has been since called *Cactus Bonplandii* by Mr. Kunth. It differs from the two following in the long whitish spines that arm it, in its very broad oval joints, its fully-expanded flower, which resembles that of *O. Hernandezii*, except that it is larger. This is the sort which in the Jardin-des-Plantes at Paris nourishes the wild cochineal: it was brought from Peru by Dombey, and according to Humboldt is in much esteem in that country as the food of a valuable sort of cochineal.—*Eng. Cyc.*

(5895) ORACHE, OR MOUNTAIN SPINAGE. Of these there are several varieties, commonly known as red and green sag—the leaves are slightly acid; both sorts are boiled as spinage, but the red is most esteemed. Propagated by seed—no particular soil required.—*Riddell.*

(5896) ORANGE, AURANTIUM, Lin. Citrus Aurantium, *Risso*, the common or Sweet Orange.

Panneh dodang, CYNG.
Orangen, DUT.
Oranges, FR.
Pomeranzen, GER.
Narunghie Kounla, GUZ. HIND.
Melaranee, IT.
Jeruklegi, JAV.
Simoa-manis; Madra Narrange, MAL.
Narungee, PERS.
Laranjas, PORT.
Pomeranezu, RUS.
Naga-runga, Swadoo Naringa, SANS.
Naranja, SP.
Kichlie-pullum, Collungie pullum, TAM.
Kichidie-pundoo, TEL.
Naringhie, DUK.
Jerooc Manis, MALAY.
Faulkner, Ainslie.

The parts used are Aurantium Fructus, Aurantii Flores, L. Aurantii Oleum; L. Volatile Oil of the Flowers, Neroli Oil. E. Aurantii Aqua; Orange Flower Water, E. Fructus succus et tunica exterior. Flores. Folia, D. Like the Lemon, this is a native of India, being found in the forests on the borders of Silhet, and also on the Nielgherries, perhaps also in China. The Sanscrit *Nagrunga* and the Arabic *Narunj* are no doubt the European names of *Naranja* (Spanish), *Arancia* (Italian), whence we have *Aurantium* and *Orange*. The orange is not mentioned either by the ancients or the Arabian medical authors. It is supposed to have been introduced into Europe after the middle ages. The Orange-tree attains a height of 16 or 20 feet and bears great abundance of fruit. It is remarkable, as well as others of the genus, for bearing the fruit at all ages at the same time with the flowers. Though a native of India, it does not ripen its fruit there until the winter, and hence has been able to travel so much further north than others of its compatriots. Leaves coriaceous, ovate-oblong, acute; margins usually finely toothed; petioles margined, sometimes winged. Petals 5, white. Stamens about 20, 5 of them often distinct and appressed against the stigma, the remainder in 5 bundles alternating with them. Fruit globose, rind thin, with convex oil vesicles, adhering loosely to the pulp, which is sweet. Oranges are cultivated in the south of Europe and in the Axores, whence they are largely imported into England. The parts which are officinal are the flowers, L., D., and their essence, L.. also called Neroli Oil and distilled water, E. Juice of the Fruit and leaves, D.

Aurantii Folia. Leaves of the Orange are officinal in the D. P. on account of their bitterness and the aromatic properties of the essential oil stored up in the vesicles with which their substance is studded. This essential oil may be obtained by distillation, as also a distilled water. Or an infusion of the leaves may be employed as a bitter and aromatic excitant and disphoretic.

Aurantii Fructus. The ripe fruit of the Orange is well known for its extremely agreeable and refreshing juiciness, whence it is so much esteemed as a fruit even for the sick, and as a refrigerant. When of a small size, the fruit which falls off is dried, and forms the *Aurantii baccæ* or Curacoa Oranges, so called from being employed in flavouring Curacoa. The smaller ones are smoothed, and used for making issues. The rind or peel for the fruit is sometimes substituted for that of the Bitter Orange, as are also the flowers and their essential oil, also the oil expressed from the grated rind, likewise Orange flower water; all being used for the same purposes as those produced from the Bitter Orange.—*Royle.* One variety of the orange fruit (of which there are various sorts) is in high estimation amongst the tamool Medical Practitioners, who suppose that it purifies the blood, improves the appetite and cures Catarrh.—*Ainslie.* The wood of the Orange tree is not available of any size, or in any quantity—*M. E. J. R.* This tree is now extensively cultivated all over the Deccan. The finest sorts are the Cintra, Cowlah, and a small sweet orange which grows on a tree more like a creeper. The principal method of culture is by budding, the stocks generally being either seedlings or cuttings from the sweet lime. The best Cintra, with a thin close rind, is produced upon the seedling stock, and it is said that the fruit grown upon the sweet lime stock is generally loose and soft: this is very perceptible with some of the oranges. The best time for budding is in the cold season.—*Riddell.* The leaves are rather bitter, and contain essential oil. A still more fragrant oil, called oil of *neroli* by perfumers, is afforded by the flowers. The berries while unripe are gathered, dried, and turned in the lathe to the size of peas, and are used in issues on account of their fragrant odour. The rind or peel of the orange is bitter and aromatic, and affords a very useful stomachic tincture and syrup. The juice of the ripe fruit contains sugar, malic and citric acids, citrate of lime, mucilage, albumen and gum. Like the lemon juice it makes an excellent cooling drink, and is an invaluable specific in the treament of scorbutic diseases. The seeds of the orange yield oil by expression.—*O'Shaughnessy.* In Tenasserim Oranges are quite abundant, but for the want of proper attention they are much inferior to the West India oranges, and to those cultivated in the South of Europe. The trees are often exceedingly prolific. A seedling planted, produced in the ninth year more than two thousand oranges. —*Mason.*

(5897) ORANGE-DYE PLANTS. The flowers of the buteas with an alkali, the corolla tubes of the tree of mourning, and the leaves of the henna tree, yield beautiful orange dyes. The latter are used in India to dye skins a "reddish-yellow."—*Mason.*

(5898) ORANGE-TREE. The orange, lemon and lime trees (Citrus,) are evergreens that seldom exceed about 15 feet in height. The wood is only met with as an object of curiosity; it is of a yellow colour, but devoid of smell.—*Tred.*

(5898) ORANGE WINE (*Auronta)* prepared by Mr. Rundall, Razole, Rajahmundry District, is quite a novelty, and is an agreeable beverage. On being tasted, it was found sound and good, although of a somewhat peculiar flavour, resembling Malmsey or Muscat. It is recommended for flavouring jellies. The jury at the Madras Exhibition considered the manufacturer is deserving of a second class Medal.—*M. E. J. R.*

(5899) ORANG-UTAN, OR ORANG-OUTANG, names by which the *Pithecus Satyrus* of Geoffroy (*Simia Satyrus* of Linnæus), the Red Orang, is now generally designated. [APE ; CHIMPANZEE.] The following are its generic characters :—Muzzle large, elongated, somewhat rounded anteriorly ; forehead sloping backwards slight supraciliary ridges, but strong sagittal and lambdoidal crests. Facial angle 30°. Auricles small. Twelve pairs of ribs ; bones of the sternum in a double alternate row. Arms reaching to the ankle-joint. No ligamentum teres in the hip joint. Feet long and narrow ; hallux not extending to the end of the metacarpal bone of the adjoining toe ; often wanting the ungueal phalanx and nail. Canines very large, their apices extending beyond the intervals of the opposite teeth. Intermaxillary bones anchylosed to the maxillaries during the second or permanent dentition. Height under five feet. It is an inhabitant of the islands of Borneo and Sumatra (*Owen.*) Professor Owen remarks that the young individual exhibits the anthropoid character in the relative smallness of the face to the cranium, resulting from the state of dentition, but that it corresponds with the adult skeleton in the number of ribs and in the relative proportion of the and lower extremities. With regard to the number of vertebræ, he observes that the figure of the adult skeleton, which was taken by permission of the board of curators from the specimen in the Museum of the Royle College of Surgeons, exhibits the abnormal number of five lumbar vertebræ instead of four, which is the number existing in the trunk of the mature Orang preserved in the Museum of the Zoological Society of London, and in the Skeleton in the Museum of Comparative Anatomy in the Jardin-des-Plantes. The form of the living animal, and its habits in captivity, have been made familiar by several specimens which have been kept in the Zoological Gardens.—*Eng. Cyc.*

(5900) ORCHIDACEÆ, a natural order of Endogenous Plants, with the stamens and style consolidated into a central column, and with an inferior ovary : they constitute the whole of the class *Gynandria monandria* of the Linnæan classification. There is no order of plants the structure of whose flowers is so anomalous as regards the relation borne to each other by the parts of reproduction, or so singular in respect to the form of the floral envelopes. [ONCIDIUM.] Unlike other endogenous plants, the calyx and corolla are not similar to each other in form, texture, and colour ; neither have they any similitude to the changes of outline that are met with in such irregular flowers as are produced in other parts of the vegetable creation. On the contrary, by an excessive development and singular confirmation of one of the petals called the labellum or lip, and by irregularities either of form, size, or direction of the other sepals and petals, by the peculiar addition of these parts to each other, and by the occasional suspression of a portion of them, flowers are produced so grotseque in form that it is no longer with the vegetable kingdom that they can be compared, but we are forced to search for resemblances in the animal world. Hence we have such names among orchideous plants as the Bee, Fly, Man, Lizard, and Butterfly Orchis, and appellations o the like nature in foreign countries. Of these things some idea may be formed by the *Oncidium raniferum,* or the Frog-Oncidium so called because its lip bears at its base the figure of a frog couchant ; 2, *Peristeria elata,* the Spirito Santo Plant of Panama, in whose flowers we find the likeness o a dove in the act of descending upon the lip 3, *Prescottia colorans*, whose lip is a fleshy hood 4, *Gongora fulva* ; 5, *Cirrhœa tristis ;* 6, *Cycnoches ventricosum*, singularly like a swan, the arched column forming the head and neck ; 7 *Oncidium pulvinatum ;* 8, *Bolbophyllum barbigerum*; 9, *Catasetum viride ;* and 10, *Peristeria cerina.* In consequence of their singular forms, thei gay colours, and the delicious fragrance of many of these plants, they have of late years been cultivated with great zeal, [EPIPHYTES.] Orchidaceous plants inhabit all parts of the world, except those which are excessively dry or excessively cold, both of which appear uncongenial to their nature; and they are most abundant in such as have an equable, mild climate, moist and warm during the greater part of the year. Thus we have not a single species from Melville Island, or Nova Zembla, or from the upper regions of northern mountains, nor from the deserts of Africa; and the whole province of Mendoza, one of the dry western states of South America, produces but one, and that in a marsh. On the contrary, the woods of Brazil and equatorial America, of the lower ranges of the Himalayas, nd of the Indian Archipelago, possess countless myriads of these productions. In general, in hot ountries the species are epiphytes, inhabiting he branches of trees, or the sides of rocks and tones, to which they cling by means of long wisting fleshy roots; and terrestrial species, that s to say, such as grow exclusively in the ground, re rare and unknown: in colder countries, on the contrary, the former are unknown nd the latter only represent the order. Thus n North America, where Orchidaceous Plants re plentiful, the epiphytal species are almost nknown, a single species only occurring in Florida upon the branches of the *Magnolia*. Some f them are true parasites, deriving their food rom the roots of trees upon which they grow. n England there are two cases of the kind, ne the *Neottia Nidus-Avis*, or Bird's-Nest Orchis, a brownish scaly plant springing up ccasionally in woods, and the other the *Corallorhiza innata*, or Coral-Root, an occasional but very uncommon inhabitant of marshes.

The differences in the structure of the column, nther, and pollen furnish botanists with the best neans of classifying the order, and of breaking up into sub-orders, in the following manner: —

1. *Malaxideæ* (*fig.* 1), anther opercular; pollen waxy, with neither caudicula nor gland.

2. *Epidendreæ* (*fig.* 2), anther opercular: pollen waxy, with the caudicula folded back upon he pollen grains, and no gland.

3. *Vandeæ* (*fig.* 3), anther opercular; pollen axy, with a membrano-cartilaginous caudicula nd gland.

4. *Ophrydeæ* (*fig.* 4), anther erect; pollen ctile or granular.

5. *Arethuseæ* (*fig.* 5), anther opercular; pollen granular or powdery.

6. *Neottieæ* (*fig.* 6), anther dorsal; pollen owdery.

7. *Cypripedieæ*, anthers two, separated by a oad sterile lobe. This order contains 394 enera and about 3000 species.—*Eng. Cyc.*

rchideæ are, perhaps, the largest natural der in the Khasia Hills where fully 250 kinds grow, chiefly on trees and rocks, but many are terrestrial, inhabiting damp woods and grassy slopes. I doubt whether in any other part of the globe the species of orchids out-number those of any other natural order or form so large a proportion of the flora.—*Hooker*, *Vol.* II. *page* 281. Fortune says, that having landed "I made the best of my way to the farm of Don Inego Gonzales de Azaola, whom I had met in Manila, and who had kindly offered me the use of his house in the interior. My chief object in visiting this part of the country was to procure, if possible, a supply of the beautiful orchid (Phalœnopsis amabilis), which Cumming had sent home a few years before, but which was still extremely rare in England. His Grace the Duke of Devonshire purchased the first plant, for which he gave the large sum of one hundred guineas. As I had very little time to spare, I was anxious to make the most of my opportunities. I made an Indian's hut in the wood my head quarters where I held a sort of market for the purchase of orchids. The Indians knew the hour at which I should return to the hut, and on my arrival I generally found the ground in front strewed with orchids in the state in which they had been cut from the trees, and many of them covered with flowers. The Phalœnopsis, in particular, was singularly beautiful. I was very anxious to get some large specimens of the plant, and offered a dollar, which was a high sum in an Indian forest, for the largest which should be brought to me. The lover of this beautiful tribe will easily imagine the delight I felt, when, one day I saw two Indians approaching with a plant of extraordinary size having ten or twelve branching flower-stalks upon it and upwards of a hundred flowers in full bloom. "There," said they, in triumph, "is not that worth a dollar?" I acknowledged that they were well entitled to the reward, and took immediate possession of my prize. This plant is now in the garden of the Horticultural Society of London; and although it was a little reduced, in order to get it into the plant case at Manila, is still by far the largest specimen in Europe. This beautiful species may be well called the "Queen of orchids." The air-plants are not found so frequently in the dense shaded parts of the Forests as in the edges of the woods, on trees by the road sides, and in exposed situations. I found the genus Aerides very often in the most dense parts of the woods, but never a single plant of Phalœnopsis. The latter was commonly found growing on the branches of the Mango in the cleared parts of the woods, near the cottages of the Indians, and sometimes on the very tops of high trees where it was fully exposed to the sun. I confess this fact was quite contrary to the opinion I had formed of the habits of these plants; for I expected to have found them principally in damp shaded forests, where the sun's rays could seldom penetrate, but such is not the case, at least in the Philippine islands. With the exception of the orchids, the Philippines are not very rich in plants of an ornamental kind. As far as I had an opportunity of judging, the vegetation of Luzon bears a great resemblance to the island of Java, and the other parts of the Malay Archipelago. The country is however very rich in birds and shells, and many of the land species of the latter are extremely valuable. Mr. Cumming, who is well known in this part of the world, made very large collections of them and has already distributed them over the greater part of Europe and America."—*Fortune's Wanderings, p.* 381.

(5901) ORCHILLA WEED. Archil, Orchella.

Orseille, Fr.
Orseille, Ger.
Oricello, Orcella, It.
Orchilla Sp.

A whitish lichen (*Lichen orcella*) found in Guernsey, Portland Island, but chiefly obtained from the Canary, Cape de Verde, and Madeira Islands. It grows on rocks about three inches in length, roundish, and many stalks proceed from one root. This weed yields a rich purple tincture, used chiefly in dyeing silks and ribbons, but rarely employed alone, on account of the fugitive nature of the colour. Litmus is a preparation of orchill in square cakes. *Waterston.* Orchilla weed is imported into Bombay from Zanzibar, and is exported to England.—*Faulkner*

(5902) ORCHIS, a genus of Plants the type of the natural order *Orchidaceæ*, and belonging to the tribe *Ophrydineæ*. The old Linnæan genus *Orchis* is now divided into many genera [Orchideæ], but a large number of species are still retained under this designation. The tribe *Ophrydineæ* is distinguished by the pollen masses being divisible into lobes, which are waxy and definite in number. The anthers are wholly adnate. The genus *Orchis* belongs to a section of this tribe, in which the cells of the anther have a rostellate process between their bases. In *Orchis* the perianth is ringent and hooded; the lip 3-lobed, spurred; the glands of the stalks of the pollen-masses are in a common pouch.—*Eng. Cyc.*

(5903) ORCHIS COMMELINÆFOLIA.—Root of two or more spindleshaped succulent tubers; scape erect, about eighteen inches high; round, smooth-jointed; with cylindric sheathes, about half the length of the joints. Flowers white, scentless; appear about the middle of the rains on pasture lands in the Southern Concan. Several species are found on the hills.—*Riddell.*

(5904) ORCHIS MASCULA. The Salep plant, is found on the Mahabuleshwar hills. It blossoms in June, and the roots are dug up and gathered after the rains in November or December. Another variety is found in the hills and jungles near Candeish, but possessing a very bitter principle. It is dug up by the Bheels, and sold when fresh for a few pice the seer. It requires a great deal of soaking and preparation before it can be deprived of its bitter quality. When dry, it is in appearnce as fine as the Persian. It requires being boiled in at least six different waters, and then dried in the sun, when it will become perfectly sweet and fit for use. —*Riddell.*

(5905) OREODAPHNE, Mountain Laurel (from ὀρειος, mountainous, and δάφνη, a laurel), a genus of Plants belonging to the natural order *Lauraceæ*. It is hermaphrodite, diœcious, or polygamous, with a 6-parted nearly equal calyx, the limb eventually disappearing. It has 9 stamens, oblong anthers, with narrow filaments, 4-celled, the three inner looking outwards. The fruit is succulent, more or less immersed in a deep thick cup formed out of the altered tube of the calyx. The flowers are panicled or racemose, axillary, and occasionally umbellulate —*Eng. Cyc.*

(5906) OREODAPHNE CUPULARIS, is a very large tree with a strong-scented wood; it has ovate elliptical leaves, acute at both ends, sometimes blunt at the apex, ending in a chanelled stalk, obsoletely netted, smooth; the axils of the costal veins without pores. The flowers are in clustered few-flowered rough hoary racemes below the axillary and terminal bud. The calyx of the fruit is nearly globose. This species is the cinnamon of the Mauritius, where it grows; and also in Bourbon and Madagascar.—*Eng. Cyc.*

(5907) ORIGANUM from ὀρίγανον), a genus of Plants belonging to the natural order *Labiatæ*; or *Lamiaceæ*. It has an ovate tubular calyx, 10-13 nerved, striated, with nearly 5 equal teeth, the throat villous inside. The corolla has a tube equal in length to the calyx; the upper lip sub-erect emarginate; the lower spreading, trifid, with nearly equal lobes. There are 4 protruding stamens somewhat didynamous. The lobes of the style are nearly equal. The species are herbs.—*Eng. Cyc*

(5908) ORIGANUM CRETICUM. (Linnæus is the 'Ορίγανον of Hippocrates, 'Morb. Mul., 1, 6 9; the 'Ονῆτις of Dioscorides, 3, 30; and the Λευκὸν ὀρίγανον of Theophrastus, 6, 2.

(5909) ORIGANUM DICTAMNUS. the *Amaracus dictamnus* of Benthan: the Δίκταμνος κρητικός of Hippocrates; the Δίκταμνον of Theophrastus, 'Hist. Plant.,' 9, 16; and the Δίκταμνο of Dioscorides, 3, 37. It has almost sessil leaves, clothed with dense wool on both su faces as well as the branches. The leaves ar broad, ovate-obtuse, quite entire, rounded a the base; the floral leaves are small, almost glabrous. The corolla purple, without a spur. Th heads of the flowers nutant.—*Eng. Cyc.*

(5910) ORIGANUM HERACLEOTICUM i a very variable species, but is recognised by th bracts being longer than the calyxes, by the loos spikes, and small flowers. The stamens are mo or less villous, the leaves pale-green, glabrous, or pubescent. The flowers are white and one-half the size of the preceding species. This, the Winter-Sweet Marjoram, seldom ripens seed in this country, and is propagated by slips and cuttings. It requires a dry and sheltered situation. It is a native of the region of the Mediterranean, Greece, and about Odessa on the Black Sea. It has an aromatic sweet flavour, and is much used as a relishing herb in cookery. This is the *Culina gallinacea* of Pliny, 20, 16; Cato, De Re Rustica,' c. 127; Seren. v. 909; and the 'Ορίγανον ἡρακλεωτικὸν of Dioscorides, 3, 29.

(5911) ORIGANUM MARJORANA, of Linnæus.

Murwa, Duk. | Maroo, Tam.

A native of India, very easily reared in beds or pots, either by slips from the roots, or seed. It is used for flavoring sauces, &c. This delicate sweet smelling plant the Hindoos offer at the shrines of Vishnoo and Sheva. —*Jaffrey.* Is the *Marjorana hortensis* of Moench, and the 'Αμάρακον of Theophrastus, 'Hist, Plant.' 6, 7; the Σάμψυχον of Dioscorides; 3, 41. It has nearly glabrous racemosely panicled branches, petiolate oblong-ovate leaves clothed with heavy tomentum on both surfaces, oblong sessile spikelets glomerate on the branchlets. This plant is tree or shrub in its native country, but an annual in our gardens It is native of the North f Africa near Mascar, on hills, and of Asia, on he mountains of Kumaon. The bracts and alyxes are complanate, closely imbricate. The orollas small, purplish or white. As the seed eldom ripens in England, it is generally procured from France. When in blossom, the plant s cut and dried for winter use, as a savoury inredient in cookery.—*Eng. Cyc.*

(5912) ORIGANUM SMYRNEUM VEL SYRIACUM. Is the Ὕσσωπος of Dioscorides, 3, 7. and of Hippocrates, 'Morb. Mul.,' 3. 490. The ancient plant is usually referred to *Hyssopus fficinalis*, but according to Fraas this plant does ot grow in Greece, Asia Minor, or Syria. *O. pyleum* of Linnæus is the Μάρον of Dioscorides, ,42.

(5913) ORIGANUM VULGARE, Marjoram, is stalked ovate-obtuse leaves, ovate bracts lon. er than the calyx, the heads of the flowers roundh, panicled, and crowded. The bracts are usuly purple, ovate-obtuse, and at least half as ng again as the calyx. It is a native of Great ritain in dry uncultivated places, and of Europe, orth of Africa, and of Middle Asia and Ameri. It is an ornamental and aromatic plant, and elds what is sold as oil of thyme in the shops, common remedy for toothache It is frequently ixed with olive oil as a stimulating liniment gainst baldness, in rheumatic complaints, and gainst strains and bruises. The dried leaves used stead of tea are very pleasant; they are likewise employed in fomentations. The essential oil is so acrid that it has been used by farmers as a caustic. It is the 'Ορίγανον μέλαν of Theophrastus, lib. vi., cap 2, and the 'Αγριορίγανος of Dioscorides, 3, 31.

(5914) ORMOCARPUM SENNOIDES, Hedysarum sennoides of Roxburgh.

Kanana, Sans. | Junglee mooughee, Hind.

Root considered tonic and stimulant.—*O'Sh. page* 317.

(5915) ORNITHOLOGY, the science which teaches the natural history and arrangement of Birds. This term is derived from the Greek words Ορνις, a bird, and λόγος, a discourse; signifying literally 'a discourse upon birds.' [Birds.]

(5916) OROBUS. Fischeri. Bitter Vetch.—Readily cultivated from seed in any good soil, colours various.—*Beg. Banopsha Per. Riddell.*

(5917) OROBANCHE (from οροβυς, a kind of vetch, and ἄγχω, to strangle, because its species grow on the roots of vetches, and were supposed to destroy them by strangulation), a genus of Plants, the type of the natural order *Orobanchaceæ.* It has 2 lateral, undivided or cloven permanent sepals; a ringent withering corolla, the upper lip concave, notched, the lower reflexed, in three unequal wavy lobes; a gland under the ovary; the anthers sagittate with the lobes pointed at the base; the filaments almost as long as the tube of the corolla, downy and glandular; the capsule ovate, pointed, with four parietal parallel placenta. The species are parasitical, usually simple, rarely branched, scaly erect herbs. Eleven species of this genus are British.—*Eng. Cyc.*

(5918) ORRIS ROOT, Iris Florentine.

Ussul-ul-sosun-ul man
joonie, Isra, Arab.
Iris de Florence, Fr.

Violen wurzel, Ger.
Ireos, It.
Kewra-ka-jur, Guz.
Hind.

Is obtained from the south of Europe and Asia Minor. It is tuberous, oblong, about an inch thick, white, odour like that of violets, taste when dry, bitter. An inferior description of orris root is imported into Bombay from the Persian Gulf, which is procurable in most bazars. Orris root is used by perfumers, and in medicine.—*Faulkner.*

(5919) ORSIDUE, Brass Leaves, Dutch Leaf or Gold, Flittergold, Manheimgold.

Klatergoud, Dut.
Oripeau, Oliquant, Fr.
Flittergold, Ger.

Orpelio, It.
Oropel, Sp.

An article resembling gold leaf, made of copper and zinc, and largely used in tinselling dolls, toys, images, &c. It is made up into books, and in this state is packed in casks and cases for exportation from Manheim in Germany, where it is chiefly manufactured.—*Faulkner.*

(5920) ORTHANTHERA VIMINEA is a plant of the family *Asclepiadeæ* well calculated to yield fibre. Dr. Royle found it growing at the foot of the Himalayan Mountains—'*Himmalayan Botany*,' p. 274. It attains a height of ten feet, and is also remarkable for the length and tenacity of its fibres. This grows luxuriantly along the foot of the mountains; and its long, straight, leafless, slender, and wand-like stems, point it out as seemingly well suited for rope-making."—*Royle. Fib. pl. p.* 1306.

(5921) ORTOLAN, the French and English names for a species of Bird belonging to the family *Fringillidæ*, much esteemed by epicures for the delicacy of its flesh when in season. It is the *Hortulanus* of Gesner and others, *Miliaria Pinguescens* of Frisch, *Emberiza hortulana* of Linnæus, Ortolano of the Italians generally, Tordino Berluccio of the Venetians, Garten Ammer and Fellammer of the Germans, and Gerste Kneu of the Netherlanders. Willughby writes the name Hortulane; and Montagu terms it the green-Headed Bunting. [EMBERIZIDÆ] This bird is found in the south of Europe, which may be considered the summer and autumnal head-quarters of the Ortolan, though it is a summer visitor in the central and northern parts. In Italy it is said to be common, by Temminck and others. Prince C. L. Bonaparte states that it is found in the Sabine Mountains, but not commonly, in the summer, and that it rarely occurs in the plain of Rome, but is frequent in Tuscany. India, Lapland, Russia, Denmark, Sweden, and Norway, are among the countries visited by it. In Britain it seems to be only entitled to rank as an accidental visitor, but it is by no means clear that it does not occur more frequently than is generally supposed: for, especially to an unpractised eye, it might be mistaken for the Yellow-Hammer, and in some states of its plumage for other Buntings. It has been taken in the neighbourhood of London; and one of these specimens was alive in 1837, in the aviary of the Zoological Society in the Regent's Park. Bewick's figure ('Green-Headed Bunting,' last edition, Supp., p. 24) was captured at sea off the Yorkshire coast, in May, 1822. In southern Europe it is common from May to August, and every spring and autumn may be observed at Gibraltar on its migration. Mr. Strickland saw it at Smyrna in April. North Africa is its winter residence. Colonel Sykes notes it in his 'Catalogue of the Birds of Dukhun' (Deccan). When properly fed, for which purpose there are large establishments in the south of Europe, where they are placed after having been trapped and furnished with plenty of millet-seed and other grain, till they become sheer lumps of fat, they are delicious morsels. Mr. Gould states that this is effected in Italy and the south of France in a dark room. Prince C. L. Bonaparte says, "Nella vicina Toscana, dove gli Ortolani sono frequenti, si mantengono nelle Uccelliere illuminate giorno e notte finché restino soffocati dalle pinguedine." (In the neighbouring districts of Tuscany, where the Ortolans are numerous, they are kept in aviaries which are illuminated day and night, where the birds are fed till they are suffocated by their fatness), and he adds the relishing words, "carne squisita" (flesh exquisite).—*Eng. Cyc.* A kind of lark called an Ortolan was found by Dr. Hooker in the Parwah district. He says abundant; this is not, however he says the European delicacy of that name, though a migratory bird; the flocks are large, and the birds so fat, that they make excellent table game. At this time they were rapidly disappearing; to return from the north in September.—*Hooker. Him. Jour. Vol.* I. *page.* 98.

(5922) ORYZA, a genus of Plants belonging to the natural order of Grasses. It is the name by which rice was known to the Greeks and Romans, and which has been adopted by botanists as the generic name of the plant yielding that valuable grain. The Greek name would appear to be derived from the Arabic Aruz, and this is allied to Uri, the Telinga name of cultivated sorts; but the Sanscrit names are Unoo, Dhanya, and Vrihi; the wild kind being called Nivara, while that of the great tanks is called Arizee in the Tamul language. The European names are evidently all derived from the same sources, but the name Paddy is applied to the rice in its natural state, or before being separated from the husk. The natives of India call it Dhan in this state, as well as the plant, and the rice itself is called Chauwul. The genus *Oryza* has two glumes to a single flower; paleæ two, nearly equal, adhering to the seed; stamens six, and styles two. Dr. Roxburgh describes two species; one, *O. sativa*, distinguished by its diffuse panicle; the other, *O. courctata*, has the panicle contracted, the valvulets of the calyx subulate, and the leaves culm-clasping. This species is a native of the delta of the Ganges, and was first discovered there by Dr. Buchanan in 1796, but was not found to be applied to any use. The Common Rice, *O. sativa*, unlike many long cultivated grains, is still found in a wild state in and about the borders of lakes in the Rajahmundry Circars of the Peninsula, though never cultivated, because the produce is said to be small compared with that of the varieties in cultivation. [RICE, in ARTS AND SC. DIV.]

(5923) ORYZA SATIVA RICE. Lin.

Arisee, TAM.
Chawul, HIND. & DUK.
Beeum, TEL.
Brass, MALAY.

This appears to be indigenous in the upper provinces of Hindoostan.—*Ainslie. p.* 217.

(5924) ORYZA SATIVA. Var.

Adypilloo Arisee, TAM.

This grain is found in uncultivated tracts of the Southern parts of the Peninsula, and is said to be eaten only in times of great scarcity.—*Ainslie. p.* 217.

(5925) ORYZA SATIVA. Var.

Amalay Arisee, Tam.

This small grain is never brought to market, nor have I ever seen it growing: it is said to be met with in the Ramnad country and to be eaten by the poor only, in times of scarcity.—*Ainslie. p.* 217.

(5926) OSBECKIA. A pretty species of osbeckia having the stamens all of equal length, is in flower on the Maulmain hills in August. —*Mason.* Dr. Wight gives Osbeckia aspera, 377; Gardnerina, 997; hispidissima, 1612; Leschenaultiana, 996; truncata, 375, 996; virgata, 376; Wightiana, 927-8.

(5927) OSSARA REWUND, See Gamboge.

(5928) OSTEOCOLLA. The term applied to an inferior kind of glue, manufactured from bones.

(5929) OSYRIS WIGHTIANA, Santalaceæ. The Lotel. A small tree with twiggy erect growing branches; in flower and fruit most of the year. The fruit when ripe is of the size of a small sloe, of a yellow color, with a mark on the top like a "blackberry." It is sweet and very pleasant when tasted, and is deservedly ranked amongst the wild fruits by Col. Sykes.—*Riddell.* Dr. Wight gives *Osyris pellata,* 817-1883; and Wightiana, 1853.

(5930) OTTER. The common Otter of India, and any of the others of this country (so far as is known), is not identical with the European Otter; but in the museum of the Asiatic Society there is a specimen of an Otter from Algeria, which (externally at least) is undistinguishable from the common Otter of Bengal, that is so extensively tamed and *trained* along the course of the Brahmaputra, as Cormorants are also trained in China.—*Bligh.*

(5931) OTTO OF ROSES.

Utter, Guz.
Gulab-ka-Uttur, Hind.
Uttur-i-Gul, Per.

This far-famed, highly valuable, and delightful perfume, is prepared in Persia, Upper Egypt, Tunis, Cashmere, and Ghazipore in Bengal. It s estimated that one hundred thousand roses, ield 189 grains or one tola of the utter. The tto of roses purchased in the bazars is generally adulterated with sandalwood and sweet oil; he genuine article being only procurable at a igh price.—*Faulkner.*

(5932) OTIS TARDA. Bustard.

Neel naray, Tam.
Jungliekaboot, Hind.
Beetmiaka, Tel.
Beetmiakie, Can,
Cowdun, also Jerz, Pers.

Various species of this genus of birds are to be met with in many parts of India, but the *O. tarda* is more rarely seen, in the lower and southern tracts of the Peninsula, than in the more northern regions. In Mysore, which, from its great elevation, is much colder than other countries of the same latitude, the Bustard is still common. —*Ainslie's Mat. Med p.* 296. Bustard is the English name of a bird belonging to the genus Otis. The species are land birds whose proper position in the ornithological system has caused some embarrassment to Zoologists.—The Bustards live generally in open countries, preferring plains or wide-spreading extensive downs dotted with low bushes and underwood-localities which give them an opportunity of descrying their enemy from afar.—They are found in Europe, Asia, and Africa; but not in America. The *Otis tarda,* the great Bustard, is the *Otis* and *Avis tarda* of Belon and others; Ostarde Hontrade, Outarde, Bistarde of the French; Starda and Starda commune of the Italians; Der Grosse Trappe, Trapp, Trappgans, and Ackentrapp of the Germans; Abutarda (*Avis tarda*) of the Spanards; and Gustard of the old Scotch. The *Otis nigriceps* is a native of Asia. The specimen from which the figure in Mr. Gould's magnificent work ('Century of Birds from the Himalaya mountains') was taken, was brought from the highlands of the Himalaya, but it is by no means confined to that locality. Colonel Sykes observed it in the wide and open country of the Mahrattas, where it lives in large flocks, and where it is considered one of the greatest delicacies as an article of food. It was indeed so abundant in the Deccan, that Colonel Sykes records, in the 'Proceedings of the Zoological Society,' that one gentleman shot nearly a thousand. The male has the body above pale bay, lightly undulated with rufous-brown; neck, a few spots on the wings, and belly, white; the head, which is crested, the outer wing-coverts, the quills, and the large mark on the breast, black; irides deep-brown; bill and feet yellowish. Length, inclusive of tail, 56½ inches; tail, 13½ inches. The female resembles the male in plumage, but is only 41½ inches including the tail, which is 10½ inches. The eggs, of which Colonel Sykes found only one in a hole in the earth on the open plain and that considerably advanced in the process of incubation, were in shape a perfect oval, and in colour a brown-olive, with obscure blotches of darker brown olive. Length $3\frac{4}{10}$ inches, diameter 27 inches.—*Engl. Cyc. page* 701.

(5933) OVEÆ (Gray). a sub-tribe of the tribe *Bovina* and family *Bovidæ.* It includes the common Sheep and allied species. The following is Dr. J. E. Gray's definition of this family:—Forehead flat or concave. The horns are more or less spiral, wider than deep at the base, and slightly annulated in front. The females are often hornless. The skull has a more or less deep rounded suborbital pit, without any fissure; the masseteric ridge ascending high before the orbit: the auditory bulla small; the basi-occipital flat, more or less expanded anteriorly by the extension of the anterior pair of tubercles, the posterior ones small; the cutting-teeth are nearly equal-sized and shelving; and there are no supplemental lobes to the grinders. The hoofs are triangular, and being shallow behind, they have distinct interdigital fossæ. Males emitting no stench. The Genera included in this family are—

(5934) OVIS, Crumen distinct. Tail elongated. Skin covered with wool or adpressed hair.

Caprovis. Crumen distinct. Tail very short. Skin covered with thick hair, covering the wool.

Pseudois. Crumen none. Tail rather elongated. Forehead convex. Skin covered with thick hair.

Ammotragus. Crumen none. Tail rather elongated. Forehead concave. Skin covered with short hair, and elongated tuft of hair.

(5935) OVIS ARIES, the Common Sheep, is subject to great variety, and many of its forms have been raised to the rank of species. Dr. Gray, in the 'British Museum Catalogue,' enumerates no less than 33 varieties of this species.

The following is a list of the varieties from the 'British Museum Catalogue':—

The Spanish Sheep. It is the *Ovis Hispanicus* of Linn.; called also the Merino Sheep and the British Middle-Wooled Sheep.

The Common Sheep (*Ovis rusticus*, Linn; *O, Gallica* Desm.; *O. brachyurus* Pallas; *O. leptura*, Schreb.): the Hornless Sheep (*O. Anglicana*, Linn.). Of this variety there are numerous forms, such as the Muggs Sheep and Shetland Sheep, the Southdown Sheep, the Old Lincoln Sheep, the Romney Marsh Sheep, the Cobwold Sheep, the New Leicester Sheep, the Cheviot Sheep, the Old Teeswater Sheep, the Improved Teeswater Sheep, the Dunky Sheep, the Zetland and Orkney Sheep, the Welsh Mountain Sheep, the Soft-Wooled Sheep of Wales, the Wicklow Mountain Sheep, the Kerry Sheep, the Exmoor Sheep, the Black-Faced Sheep. the Black-Faced Heath-Sheep, and the Rass or Roosh (*Ovis Polii*, Blyth.)

3. The Barwall Sheep *Ovis* (*Aries Barwal* Hodgson); *Ovis Barwal*, Hodgson; *O. Ammonoides* var. 1, Gray. It inhabits Nepaul.

4. The Huniah Sheep (*Ovis Hunia*, Hodgs.); The Hoonia, or Black-Faced Sheep of Tibet Also a native of Nepaul.

5. The Cago (*Ovis Cagia*, Hodgs.) the Kago, or Tame Sheep of Cabul region; the Cago Sheep of Gray. A native of Nepaul.

6. The Seling. A native of Nepaul.

7. The Curumbar Sheep of Mysore.

8. The Sheep called Garar in India.

9. The Dukhun Sheep.

10. The Shaymbliar Sheep of Mysore.

11. The Broad-Tailed Sheep (*O laticaudatus*, Erxl., Geoff., 'Mem. Egypt,'; Lesson, 'Comp. Buffon,' x. 812; *O laticauda platyceross. Arabica*, Linn.; *O. Turcica*, Charlet; *O. cauda abesa* Ludolf), It is a native of Barbary. There are several forms of this variety, of which the following are most prominent:—The Fat-Rumped Sheep (*O. Steatopyga*, Pallas; the Tartarian Sheep of Bewick); the Persian Sheep *O. A. ecaudatus*, (Geoff.); the Fat-Tailed Sheep (*O. A. macrocercus*, Schreb.); the Aora Fivel, or Abyssinian Sheep; the Bucharian Sheep *O. Bucharica*, Pallas); the Tibetan Sheep *O. Thibetanus*, Fischer); the Cape Sheep *O. Capensis*, Erxleb.); the Sheep of Belkah.

12. *Many-Horned Sheep* (*O. polyceratus*, Linn.). It is also called the Four-Horned Ram, and the Dumba Sheep. It is a native of Nepaul.

13. The *puchia*, or Hindustan Dumba (*O. puchia*, Hodgson).

(5936) *Caprovis Vignei*, this genus embraces the Sha, or Koch. It is the Mountain Sheep of the North of India, and is found in Tibet.

C. Argalis, the Argali. It is the *Ægoceras Argali* of Pallas, and often confounded with the former. It is a native of Siberia. Dr. Gray says of this species—"The Nyens or Bambheras, or Wild Sheep, seldom or never cross the Hemachal, the Indian side of which range in the special habitat of the Nahoors, while to the north and west beyond Thibet, our animal is replaced by other species, so that Thibet may be considered as the special habitat of one species (*Ovis Ammonides*), and the plateaux north of Thibet as far as the Altai of another (*Ovis Ammon*). cited as types of the true ovine form; and it may be added, that the six sorts of tame sheep of Thibet and the Sub-Himalayas all without exception exhibit the essential characters of that form. "There are several species that may be confounded under this head: the Siberian Argali is found in the most northern part of that country, and it is probably different from the Himalayan animal; but I have not been able to discover any difference between the specimen received from Mr. Hodgson and those which were sent from Siberia by the Russian naturalist."—*Eng. Cyc.*

(5937) *Pseudois Nahoor*, the Nahoor, Nervate or Sna, is a native of Nepaul.—*Eng. Cyc.*

(5938) OVIS AMMON OF PALLAS, stands from four to five feet high, and measures seven feet from nose to tail. It is quite a Tibetan animal, is seen as high as 18000 feet and is seldom seen below 14000 feet except when driven lower by snow.—*Hooker, Vol.* 1, *p.* 244.

(5939) OVIS POLII, O. ammonoides, Capra hymalaica, C. jemblaica, were sent to the Paris Exhibition of 1855.—*Paris E. J. R.*

(5940) OXALIC ACID.

Sauerk-lees-aure, GER.

A vegetable acid, found in considerable quantity in sorrel and rhubarb. Accidents have frequently occurred from its being administered instead of Epsom salts, which it resembles in appearance. It is used in calico printing, and by straw-hat makers. It is an object of considerable importance in Switzerland, where it is prepared from the juice of wood-sorrel. Oxalic Acid is obtainable from the Salt in the leaves of Gram, Cicer Arietinum.—*Faulkner. Taylor.*

(5941) OXALIS (from ὀξύς, sharp, acid; the leaves have an acid taste), a genus of Plants belonging to the natural order *Oxalideæ* or *Oxalidaceæ.* It has 4 sepals connected below, and 5 petals which are likewise frequently connected below. The stamens are 10 in number, and monadelphous; the 5 outer ones shorter than the rest. The styles 5, and the capsules oblong and 5-cornered.—*Eng. Cyc.*

(5942) OXALIS ACETOSELLA. Common Wood-Sorrel, is a small perennial plant with a subterranean rootstock consisting of many scaly joints; the leaves are ternate, leaflets obcordate and having the peduncles longer than the leaves, with two scaly bracts at about the middle; the corolla is about 4 times as long as the calyx, and of a white colour beatifully veined with purple. Mr. Curtis remarks that the leaves are often purplish beneath, and that the fruit darts forth its seeds at the smallest touch when ripe. This species of wood-sorrel has a pleasant acid taste, dependent on the presence of oxalic acid, and is frequently used in salads; its flavour approaches near to that of lemons or tartaric acid, with which ts medicinal effects also correspond, as it is esteemed a refrigerant antiscorbutic and diuretic. The expressed juice of this species, evaporated and set in a cool place, affords a crystalline salt, which may be used whenever vegetable acids are wanted. It is sold in the shops under the name of Essential Salts of Lemons, and is employed to take iron-moulds and ink-spots out of linen.

(5943) OXALIS CORNICULATA, Sorrel Yellow-Wood sorrel. Lin. (Three leaved sorrel.)

Pooliary keery, Tam.
Umbutic ke banjee, Duk.
Shooklika, Sans.
Umbuti, Duck.
Pullachinta, Tel.
Amrool, Hind.

Poollie chinta koora. Tel.—*Ainslie's Mat. Med. p.*256.
Chukaika, Ambashta, Amilka, Sans.
Chooka-tiputtee, Beng.

Oxalis Corniculate, Horned Wood-Sorrel, has a decumbent stem, branched and rooting; the leaves are ternate with obcordate leaflets; oblong stipules united to the base of the petioles; the peduncles are two-flowered, and shorter than the leaves. It is a native of Europe, particularly in Spain, Italy, and Greece, as well as of Japan, Mexico, North, America, and England. The flowers are yellow. The flowers of the North American plant are larger than the European. This species is common all over India, possesses exactly the same properties, and yields the same products as the European sorrel. The small leaves, tender shoots, and flowers, are given in electuaries by the Hindoos as a cooling medicine in fevers, the extent of two tea-spoonsful daily.—*O'Shaughnessy, p.* 257. The stem of this plant is imported from Delhi: very sour: used to cure flatulent indegestion.—*Gen. Med. T. p.* 153. A common weed on lawns and in gardens—used by the natives in making chatney; and in curries, a good substitute for lime juice or tamarind imparting a peculiar acid taste.—*Jaffrey.*

(5944) OXALIS ROSEA. Tuberous rooted plants, from the Cape of Good Hope, easily cultivated at the commencement of the rains; the small tubers should be allowed to remain in the pots in which they have grown and be carefully removed into fresh earth after the rains have set in, and if well attended to, will readily spring up, and produce abundance of rose coloured flowers.—*Riddell.*

(5945) OXLEYA XANTHOXYLA, is a native of Australia. It attains a height of 100 feet. The wood is yellow, and employed for building boats. It is called yellow-wood. [Swietenia; Cedrela.]—*Eng. Cyc. page* 802.

(5946) OXYLOBIUM CORDIFOLIUM. These are ornamental plants, easy of culture, in any common soil; the colours are yellow, orange and scarlet.—*Riddell.*

(6947) OXYSTELMA ESCULENTUM. *Syn.* Periploca esculenta. Asclepias rosca.—*Roxb. Fl. Ind.* ii. *p.* 40. A twining perennial, deciduous plant, flowers in the rains, large white, with a slight tinge of rose colour, and streaked with purple veins; texture thin and delicate.—*Riddell.* Common in India on the banks of rivulets, used by the natives in decoction as a gargle in apthous ulcerations of the mouth, and in sore throat: cattle eat the roots. (*Royle.*)—*O'Shaughnessy, p.* 457.

(5948) OXYURA CRYSANTHEMOIDES. Native of Britain, and North America, cultivated in any garden soil.—*Riddell.*

(5949) OXYURA. Mountain sorrel.

(5950) OYSTER.

Huitre, Fr.
Austern, Ger.
Ostriche, It.
Kaloo, Guz.

Seepee, Hind.
Ostreæ, Lat.
Ostras, Sp.

A well-known and generally diffused shell fish. —*Faulkner.*

(5951) OYSTER SHELL, See Mother of Pearl Shell.

P.

(5952) PABUT: PALOOD. In the Punjab and Cashmere, there are different kinds of white earths, which are used by the Hindoos under under the name of Pabood in the religious ceremonies. The genuine, what I got at Lahore was carbonate of magnesia combined with a very small quantity of oxyde of iron. I received an inferior kind in Cashmere, which was a product of the hills, namely, from Amernat, this earth was carbonate of lime and magnesia with very little oxyde of iron.—*Honigberger. p.* 321.

(5953) PACHYDERMATA (literally Thick-Hides; Dickhauter of the Germans; Pachyderm of the French), the seventh order of *Mammalia* according to the system of Cuvier.—*Eng. Cyc.*

(5954) PACHYRHIZUS, has a long compressed pod, with kidney-shaped seeds and no dissepiments, and is remarkable for its principal species, *P. angulatus* (formerly *Dolichos bulbosus*), producing a root of the size and substance of a turnip. It is reported to have been carried to the Pilippines from South America, and thence to have been introduced into the west of Asia. The side leaflets are nearly triangular, that in the middle lozenge-shaped, slightly toothed, and shaggy on both sides. The flowers are very beautiful, of a violet-blue colour, and arranged in axillary nearly erect racemes, from one to two feet long. Its root is a common article of food in the Malay Archipelago, but no other part of the plant is eaten.—*Eng. Cyc.*

(5955) PADDY.

Bhatt, Guz. & Hind.

A term applied to rice in the husk.—*Faulkner.*

(5956) PADDY BIRD FEATHERS are extremely light, soft, and delicate; resembling the down of the Eider duck. Their colour is white, sometimes slightly variegated with black. Muffs, tippets, and other similar articles, made of these feathers, are often brought from India, as presents.—*Comp. Desr.*

(5957) PADMAK. The wood of a tree from the Himalayas, considered to be refrigerant.—*Gen. Med. Top. p.* 149.

(5958) PÆDERIA, a genus of Plants belonging to the natural order *Cinchonaceæ*. It has a small 5-toothed permanent calyx, a funnel-shaped corolla, hairy inside, 5-lobed, and with a plaited æstivation. There are 5 stamens, sometimes abortive; the anthers oblong, nearly sessile in the middle of the tube. The style is not protruded, and the stigma bifid. The berry is small, roundish, and globose, tricelled, with a seed in each cell. The flowers are small, white, and usually unisexual.—*Eng. Cyc.*

(5959) PÆDERIA FŒTIDA.

Gundha-Badhalee, Beng. | Gundale, Hind.

Pæderia has a woody twining stem, round and smooth. The leaves are oblong or lanceolate, cordate at the base, and glabrous. The panicles axillary, terminal, opposite, short, and few-flowered. The flowers are usually of a deep pink, the bracts ovate, the calyx 5-toothed, the corolla with a long tube somewhat gibbous and woolly inside; the limb narrow and divided into 5-cordate crenulate segments. The berry is dry, compressed, having 5 lines on each side, 1-celled, and 2-seeded. The seeds are smooth, compressed, enlarged with a somewhat membranous ring all round. The leaves have a very fœtid and aliaceous odour when bruised, yet they are used to impregnate baths, and are administered in a decoction medicinally in cases of retention of urine and some febrile complaints. According to Roxburgh the root is used by the Hindoos as an emetic. It is a native of the East Indies, and of Japan and the Moluccas.—*Eng. Cyc.*

(5960) PÆDERIA TERNATA has an erect smooth trichotomous steam, with triangular branchlets; leaves 3 in a whorl; oblong-lanceolate axillary trichotomous corymbs shorter than the leaves; the limb of the calyx campanulate and obscurely 5-toothed. It is a native of the East Indies on the mountains which border on Silhet. The flowers are rather large, funnel-shaped white, on long filiform pedicels, each pedicel having a pair of linear ciliated bracts above the middle. The flowers are said to be fragrant when fresh, but emit a very offensive smell on being steeped in water after they have been dried.—Lindley, *Flora Medica.*—*Eng. Cyc.*

(5961) PÆONIA is a genus of Plants belonging to the natural order *Ranunculaceæ*. The species are very generally cultivated in gardens for the sake of their large gaudy flowers. They are characterised in their order by a permanent leafy calyx of 5 unequal sepals, 5 petals, stamens whose anthers split open by two fissures along their face, a fleshy elevated disc, and from 2 to 5 many-seeded carpels, terminated by a fleshy recurved stigma. Their fruit consists of leathery follicles, splitting on one side, and exposing to view a number of round, black, shining seeds adhering to a crimson placenta.—*Eng. Cyc.*

(5962) PÆONIA ARBOREA. These beau-
ful flowering plants, the herbaceous species of
hich are so generally cultivated in England,
d thrive best in the conservatories, are not
nown in Western India. *Riddell.*

(5963) PÆONIA MOUTAN is a shrub, of
hich several varieties, with beautiful whitish
owers stained with pink, are now in British
rdens. Of these the most showy is that called
. *papaveracea*, which has a broad crimson
ain at the base of each petal. If grown on
e north side of a wall, or in a situation where
is but little exposed to the sun in the early
rt of the day, this species will bear the open
r of England without protection; but it
routs so early in the spring, if exposed to the
n, that it is very liable to be cut off by the
e frosts of England. It is a native of China.
the other species, *P. Brownii* and *P. Cali-*
rnica are remarkable for being the only species
abiting America; they are natives of Califor-
and of the country to the northward, and
ve little beauty: the first exists in English gar-
ns, but is extremely rare. The rest of the genus
nsists entirely of European and Asiatic plants,
ich, according to De Candolle, form fifteen
ecies; but there can be no doubt that the
ater part of these supposed species are mere
rieties, chiefly of *P. officinalis*, *P. albiflora*,
tenuifolia, and *P. peregrina*. All these
nts are liable to produce double flowers,
ich, by the conversion of their numerous
mens into petals, are generally extremely
utiful: they have however no smell, or
an agreeable one. Being quite hardy,
wing readily in any kind of soil, and
ily multiplied, either by seeds or by division
the roots, they are generally favourites in
dens. All the species have an acrid princi-
concentrated in their roots and seeds, which
accordingly emetic and cathartic in moderate
ses. They were formerly in great repute as a
dicine; and Dioscorides, whose Παιωνία was
bably both *P. officinalis* and *P. peregrina*,
es no fewer than sixteen names, by which it
known.—*Eng. Cyc.* See MOUTAN.

5694) PAGRUS, a genus of Fishes belong-
to the family *Sparidæ*, with the following
racters—Four or six strong concave teeth in
nt, supported by smaller conical teeth behind
m, with two rows of rounded molar teeth on
side of both jaws. [PAGELLUS.]—*Eng. Cyc.*

5965) PAGURIDÆ, OR PAGURIANS, a
e of the apterurous section of the Anomurous
ily of *Crustacea*, composed of a considerable
nber of species, the greater part of which are
arkable for the more or less complete soft-
of the abdomen, the want of symmetry in
appendages of this part of the body, the
rtness of the two posterior pairs of feet, and
y other characters. Modern writers recog-
several genera of this family. The *Pagurus* of Aristotle is not a Hermit-Crab; but he describes three kinds of hermit-crabs under the name Καρκίνιον. They are termed Καρκίνας by Oppian, Ælian, and Galen.—A great resemblance exists among all the *Paguri*, *Pagurus* (Fabricius), properly so called, not only in the details of their organisation, but in their habits. The cephalo-thoracic portion of their body is shorter than the abdominal portion.—*Eng. Cyc.*

(5966) *Pagurus Deformis.* Ocular peduncles very stout and short, rather longer than the basilary portion of the external antennæ, but much shorter than the anterior border of the carapace; cornea large, and occupying half the length of the terminal joint of the ocular peduncles. Anterior feet short and stout, especially on one side, smooth externally but spiny above; a dentilated crest on the upper border of the large moveable finger. Succeeding feet smooth, and with but little hair, furnished externally with a projecting crest, which extends over the two first joints, and which, in the third foot, is very much developed and finely dentilated. Nothing similar on the opposite side. Abdomen furnished with four large transverse plates, each with an oviferous false foot, the first three of these are large, and terminated by three elongated and ciliated laminæ in the female. In the male all these appendages are small, and terminated by a single lamina. Length 5 inches. It is a native of the Mauritius and the Seychelles.—*Eng. Cyc.*

(5967) *Cenobita* (Latreille).—This genus, in the opinion of M. Milne-Edwards, establishes the passage between the *Paguri*, properly so called, and *Birgus*.

(5968) *Cenobita rugosa.* Stomachal region nearly flat; labial border of the branchial regions very projecting, and slightly curved. Ocular peduncles nearly twice as long as they are high; their basilary scale moderate and pointed. Feet granulous and slightly muricated; the great claw moderate, and furnished above with a row of small, oblique, and parallel crests. Tarsi short and triangular. Upper and external edges of the two last joints of the third left foot elevated into an obtuse crest. Length about 3 inches. It is found in the Indian Ocean. There are three other species.—*Eng. Cyc.*

(5969) PAGUMA TRIVIRGATA.

SYN. Paguma trivirgata, Gray.
Viverra „ Reinward, Mus. Leyd.
Paradoxurus trivirgatus, Gray.

In Burmah, this animal is very common, and occasionally enters houses in the towns in pursuit of rats. When young it is easily domesticated, and valuable as a rat-catcher. It does not appear to have been seen in Arracan.—*Mason.*

(5970) PALANG POSH OR PALAMPORE. The former term is composed of two Persian words, literally "Bedcover." These are manufactured in the district of Cuddalore at Ponnary also at Sydapett in the outskirts of Madras, but especially in the town of Masulipatam, the last always of a superior kind and in various sizes, 5½ to 6 cubits in breadth and 7 to 8 long and are sold from 6 Rupees to Rs. 15 according to size. The Cuddalore, Pannary and Sydapet fabrics are of ordinary quality and are sold at from Rupees 2 to 7 each.

(5971) PALAS GUM. Pulas goond or Dhakke goond. Produce of Butea frondosa, in ruby red, transparent grains or irregular tears.

(5972) PALEMONIDÆ, a family or tribe of Macrurous Decapodous *Crustacea*. They belong to Milne-Edward's family of *Salicoques*, or Shrimps, and his tribe Palemonians. The characters of this tribe are as follows:—Body laterally compressed, but the abdomen never sharp. Thorax large, carapace armed in front with a great sabre-like rostrum, nearly always dentated above. Antennæ placed as in the preceding tribe, but longer, and the first pair often with three terminal filaments. All the feet are slender, and the first two pairs are generally didactylous, whilst the last three pairs are never didactylous. The abdomen is of great size. (Milne-Edwards.) The genera are, *Gnathophyllum*; *Hippolyte*; *Rhynchocinetes*, *Pandalus*; *Lysmata*; and *Palemon*.

(5973) *Rhynchocinetes*. (Edwards).

R. Typus. Front armed with three spines, of which the median, placed above the base of the rostrum, is followed by another median spine; rostrum very large, longer than the lamina of the external antennæ, armed above with two spines situated near the base, and with seven or eight dentilations situated at its extremity; its inferior border furnished with a score of very large teeth. Length about 2½ inches. It is a native of the Indian Ocean. (Milne-Edwards.)

(5974) *Palemon*. (Fabr.) THE PRAWN. Body compressed but little, and generally rounded above. M. Milne-Edwards remarks that the nervous system of the Palemons presents a much greater concentration than that of the Crawfishes (Ecrevisses); for all the thoracic ganglions are approximated, so that they nearly touch each other. The branchiæ, he observes, are eight in number on each side of the body. The species of this useful and delicious genus are numerous. M. Milne-Edwards records seventeen, besides the Indian *Palemon brevimanus* and *P. Coromandelinus* of Fabricius. Those of British coasts are well known to the epicure; and some of the species which are found in warm climates attain to a considerable size: such are the *P. Carcinus* of the Indian seas and the Ganges, which attains to nearly a foot in length, and the *P. Jamaicensis* of the Antilles, which is from 10 to 12 inches long. The prawns generally inhabit sandy bottoms near the coasts, but some are found at the mouths of rivers, and far up. They mostly boil red.

(5975) *Alpheadæ*. The shrimps comprised by M. Milne-Edwards under this tribe, are stouter in their forms than those of the preceding division; but they are not depressed as the Crangons are. [CRANGONIDÆ.] The genera are *Atya*, *Hymenocera*, *Alpheus*, *Pontonia*, *Autonomea*, *Caridina*, *Nika*, and *Athanas*.

(5976) *Alpheus* (Fabr.).—Carapace advance above the eyes, forming above each of thos organs a small vaulted buckler. They ar found in the seas of warm climates. Som species are found in the Mediterranean, bu the greater part in the seas of the Antilles or i the Indian Ocean.

(5977) *Pontonia* (Latr.).—Carapace short an convex: the front with a short but robust and in flected rostrum; the eyes are cylindrical, project ing, and very moveable. M. Milne-Edward divides the *Pontoniæ* into the following sec tions:—

P. macrophthalma, from Asiatic seas, wher it was found by M. Dussumier.

(5978) *Stenopus* (Latreille). *Penædæ of* Milne Edwards: Body not compressed laterally, an teguments comparatively soft. Carapace terminat ed anteriorly by a small rostrum.

Stenopus hispidus; *Palemon hispidus*, Oliv from the Indian Ocean.

(5979) *Acetes* (Milne-Edwards).—Analogou to *Sergestes* in its conformation, but placed at distance from all the animals of the same orde by the absence of the last two pairs of feet.— *A. Indicus*.—*Eng. Cyc.*

(5980) PALI.

Pali, TAM.
Irambu, MAL.
Palari, PORT.

The Ceylon wood known in England by th name of Iron wood. It grows to about thirty fe in height, and twenty inches in diameter. It very useful for stocks of anchors, piles for jett heads, beams in store houses and places wher strength is required; for such purposes it wi be found useful and durable: it may be obtain in great quantities at a very moderate rate.— *Edye. Ceylon.*

(5981) PALINURUS, the name given Fabricius to a genus of *Crustacea* which form the tribe of Langoustiens in the system of M Milne-Edwards, being the fourth of his family Cuirassed Macrurians, and characterised by t existence of antennæ of the ordinary form and t absence of didactylous pincers. It is also r garded as the type of a family of the *Palinurid* The *Palinuri*, or Sea-Crawfish, as they are pop larly called, have the body nearly cylindric Their carapace is nearly straight from befo backwards, very convex transversely, and presen about its anterior third part a deep transver furrow, which is directed forward on each si and separates the stomachal from the cardial a branchial regions, the only ones which can well distinguished.—*Eng. Cyc.*

(5982) PALINURUS FASCIATUS, Antennular ring armed above with two conical rather large teeth situated near its anterior border. Carapace armed with a small number of spines, and slightly granular, or only dotted on its posterior half; lateral tooth of the anterior border of the carapace small; no spines on the median line of the stomachal region; median tooth of the anterior border of the epistome very large. Length about a foot. It is a native of the Indian Ocean.—*Eng. Cyc.*

(5983) PALINURUS VULGARIS, the common Sea Craw-Fish, or Spiny Lobster; *Langouste* of the French. Length about 18 inches. Weight sometimes from 12 to 15 lbs. It inhabits the seas of Europe, and is common on the rocky coasts of Britain especially in the South; and on the like coasts of France, especially in the south and west.—*Eng. Cyc.*

(5984) PALMACEÆ, *Palms*, a natural order of Endogenous Plants, usually trees, with simple stems, inhabiting the warmer parts of the world and especially tropical countries. They constitute a most important order, on account of the many uses to which the species or their products are applied. They are nearly allied to the Liliaceous and Juncaceous or Rushy Plants of northern countries. Linnæus, who had scarcely any means of judging of the real structure of their fructification, and was therefore uncertain where to station them in his sexual system, placed them in an Appendix by themselves and called them the Princes of Vegetation. It has now however been ascertained that they chiefly belong to *Hexandria*, *Monœcia*, and *Diœcia*. In general they adhere to the soil by clusters of strong simple roots which not uncommonly form a hillock elevated above the surface of the ground. Their trunks are solid, harder on the outside than the centre, and are sometimes, as in the Cane Palms, coated by a layer of siliceous matter; they are usually quite simple, growing exclusively by a single terminal bud, called in the *Areca* its cabbage, and eaten as a delicacy when boiled; but in the *Hyphæne*, or Doom-Palm, they are reguarly forked. In the majority of the order the stem is nearly cylindrical, but in some it is thickest at the base, and in others swollen in the middle; occasionally it is defended by strong hard pines, but is more frequently unarmed, and marked by rings which indicate the places whence he leaves fall off. The leaves, called fronds by Linnæus, are alternate, with a very hard epidermis and a distinct petiole, from the base of which a coarse network, called reticulum, sometimes separates next the trunk; they are usually either pinnated or fan-shaped, but are occasionally nearly split in two; their veins are parallel, the spaces between them plaited, and he whole size sometimes very great, as in the Fan-Palm, in which specimens have been seen as much as 18 or 20 feet in breadth. [CORYPHA.] The flowers appear in panicled spikes from the inside of hard dry spathes, which are often boat-shaped, and although small, they are sometimes so extremely numerous that each panicle will weigh many pounds. They are generally hermaphrodite, but often monœcious, diœcious, or polygamous. The calyx and corolla consist each of three pieces, which are either distinct or more or less united. The stamens vary in number, from 3 to a large multiple of that number, and bear 2-celled linear anthers, which open along their inner face. The ovary consists of 3 carpels, which are sometimes distinct, sometimes consolidated, and occasionally in part abortive, so that the ovary is only 1-celled. The ovaries are almost always solitary, and erect in each cell, but sometimes two are present, which in that case stand side by side; they are orthotropous in some genera and anatropous in others. The styles are very short, the stigmas simple. The fruit varies extremely in its consistence and appearance. Sometimes it is 3-celled, often 1-celled; in such species as the Cocoa-Nut it is a kind of drupe covered by a coarse fibrous rind; in others it is a soft sweet eatable pericarp, as in the date; in others its surface is broken up into lozenge-shaped spaces, as in the *Sagus*, whose fruit looks as if covered with scale-armour. The seed is single, either solid or hollow, and consists principally of albumen of a fleshy, oily, horny, or cartilaginous texture, within which is lodged a very small cylindrical embryo at some part of the surface distant from the hilum. Palms appear to prefer a soil in some measure salt, although many species are inhabitants altogether of inland districts and even of high mountains. Their geographical limits appear to be within 36° N. lat. in America, 44° N. lat. in Europe, 34° N. lat. in Asia, and 38° S. lat. in the southern hemisphere; and according to Von Martius, their powers of migration are extremely small; none of them have been able to cross the ocean without the aid of man. Their favourite stations are said to be the banks of rivers and water-courses, and the sea-shore, some species scattered singly and others collected together into large forests. There is scarcely a species of this order in which some useful property is not found. The Cocoa-Nut [COCOS], the Date [PHŒNIX], and others are valued for their fruit; the Fan-Palm and many more for their foliage, whose hardness and durability render it an excellent material for thatching; the sweet juice of the Palmyra [BORASSUS] when fermented yields wine; the centre of the Sago-Palm abounds in nutritive starch; the trunk of the *Iriartea* or *Ceroxylon* exudes a valuable vegetable wax [CEROXYLON]; oil is expressed in abundance from the Oil-Palm; an astringent matter resembling dragon's blood is produced by *Calamus Draco;* many of the species contain within their leaves so hard a kind of fibrous matter, that it is employed instead of needles, or so tough that it is manufactured into cordage; and finally, their trunks are in some cases valued for their strength and used as timber, or for their elasticity, or their flexibility, as in the Cane-Palm.[CALAMUS.]—*Eng. Cyc.* Thus, the Palms, so conspicuous in tropical countries for their lofty pillar-like stems, surmounted by apparently inaccessible fruit or gigantic foliage, are no less remarkable for the many useful purposes they are calculated to fulfil. The fruit of some is edible, of others abounding in oil, the sap of a few forms a pleasant beverage, and may by evaporation yield sugar or be fermented into a spirit. The stems of some species are gorged with farinaceous matter, which may be separated as a starch-like powder or granulated into sago. The broad leaves, from their great size and hard surface, are useful for thatching the cottages of the poor, or for making umbrellas for the rich. The narrow-leaved kinds are plaited into mats and baskets, or smoothed so as to be fit for writing on; while the leaves of several, when in a young and tender state, are eaten, both raw and in a cooked state, and are hence called Cabbage Palms. Some abound in strong unyielding fibre, while others form wood which is applicable to all the purposes of timber. Hence, several are valuable articles of culture in the countries where they are indigenous, or where the soil and climate are suitable for their growth—as, for instance, the Date Palm in Arabia and Africa, the Oil Palm in the West of Africa, the Cocoa-nut in India and its Islands, together with the Betle-nut, Palmyra, and Talipat Palms; while the Sago, the Ejoo, and the Betle-nut Palms flourish in the moist warm climates of the Malayan Peninsula and of the Indian Archipelago. The Palms abound chiefly in the tropical parts of South America, as well as of the Old World; but a few species extend to rather high latitudes, as an Areca to lat. 38° S. in New Zealand, and a Sabal (Chamærops, *Auct.*) to lat. 40° N. in North America; while the Dwarf Palm, a native of the North of Africa, is now at home in the South of Europe. There even the Date Palm is grown in a few sheltered situations; though it is in the hot and dry soil of Arabia and Africa that it attains the greatest perfection, and furnishes a principal part of the diet of its inhabitants, as well as an article of commerce. *Phœnix sylvestris*, a variety or species of the same genus, is common in most parts of India. A Chamærops is found in Nepal, and one on the Khasya Hills, at elevations of from 5000 to 8000 feet; while *C. Ritchiana* is found in the Khybur Pass, and probably all along the mountainous range from Affghanistan to Sindh. But it is in far southern latitudes and in a different climate that the Cocoa and the Betle-nut Palms are objects of extensive culture as well as the Sago Palms, of which the Ejoo or Gomuto of the Malays is one (the *Arenga saccharifera* of botanists), abounding in sap, which can be used as palm wine or converted into sugar; yielding at all times strong and durable fibre. The older trees when cut down yield sago, as do *Sagus Rumphii* and *S. lævis*, especially abundant in and near Sumatra. The latter is remarkable among Palms for throwing up young plants around it in the same manner as the Plantain. Both kinds of Sago tree are strongly recommended for cultivation—the Arenga on low coasts near the sea, but the species of Sagus even on the edges of the marshes which abound in such situations. It is no doubt to some one of these Sago trees that Sir John Maundeville alludes, when he says: "In that land grow trees that bear meal, of which men make bread, white and of good savour; and it seemeth as it were of wheat, but it is not quite of such savour. And there are other trees that bear good and sweet honey; and others that bear poison.—And if you like to hear how the meal comes out of the trees, men hew the trees with an hatchet, all about the foot, till the bark be separated in many parts; and then comes out a thick liquor, which they receive in vessels, and dry it in the sun, and then carry it to a mill to grind, and it becomes fair and white meal; and the honey and the wine, and the poison, are drawn out of other trees in the same manner, and put in vessels to keep." ("The Book of Sir J. Maundeville," chap. xviii.) The leaves of many Palms are employed for thatching, for making chattahs or umbrellas, punkahs, and hats. The stems of *Licuala acutifida* afford the well-known walking sticks known by the name of "Penang Lawyers.' (Griffith) Thus, those of *Licuala peltata*, the *Chattah-pat* of Assam, are in universal demand in that valley. Scarcely a single ploughman, cow-keeper or cooly, but has his Jhapee or Chattah made of Chattah-pat (Jenkins). But the leaves of this Palm are coarser than those of another, the *Toka-pat* of the Assamese, which has been named in honour of the zealous Commissioner of Assam, *Livistona Jenkinsiana*, by the late Mr. Griffith. Col. Jenkins says that this species of Palm is an indispensable accompaniment of every native gentleman's house, but in some parts it is rare, and the trees are then of great value. The leaves are in universal use throughout Assam, for covering the tops of doolees (palkees), and the roofs of the boats; also, for making the peculiar hats, or rather umbrella-hats (jhapees) of the Assamese. For all these purposes the leaves are admirably adapted, from their lightness, toughness and durability." To the above list of useful Indian Palms, we might easily add some, such as *Zalacca macrostachya*, used for making baskets and for tying Nipa leaves (p. 36), as well as mention the native names of others employed for many of the same purposes as the foregoing. The Chinese are said to make cables of Palm leaves. The *Areca vestiaria* is so called from clothing being made from its fibres, and *Rhapis cochinchinensis* is employed for thatching, &c. *Lodoicea Seychellarum* (the Palm yielding the formerly much famed "Cocos de Mer" or "Double Cocoa-nut") are formed into baskets and flowers —for a specimen of which, in the Mauritius collection, a Prize Medal was awarded at the Exhibition of 1851. The Palms prove the great value of these plants to the regions where they are indigenous —yielding flour and sugar milk and honey-like fluids, demulcent drinks and fiery spirit, fibre for cordage and for clothing, leaves for thatching and for platting, as well as wood for a variety of purposes. There is little doubt that some may yield the fibre which so abounds in their leaves, sufficient easily to be useful to the paper-maker.—*Royle, Fib. p.* Further information on the various palms of Eastern and Southern Asia, the Coco-nut palm, Palmirah, Corypha, Caryota urens, Arenga Saccharifera, will be found under these several heads. This natural order of plants is one of the largest, the most beautiful, as well as the most useful of the whole vegetable kingdom. They are almost exclusively plants of tropical countries. They belong, systematically speaking, to the Endogens or monocotyledons, the same great division which comprises the grasses, Sedges, Lilies, Orchids and Screw-pines and most of them attain the size and assume the aspect of trees. Palms having arrived at the proper age, flower every year until they die, or only once during the whole course of their existence, and have sometimes from 200,000, to 600,000 flowers on a single tree. The fruits are almost of every colour, and a single spathe of the Seje Palm of the Orinoco bears as many as 8 0) of them. The common cocoanut is one of the largest of the fruits and the double cocoanut of the Seychilles measures ab ut four feet in circumference and probably surpasses all others in dimensions. There are not less than 1 00 known species of this useful plant. Palms are associated with the most sublime truths of Christianity, and in our every day life we speak of our "Palmy day" and "carrying of the palm," as happy and excellent times and seasons of rejoicing. Various products are largely made use of by the inhabitants of the countries in which they grow, and they are exported to peoples thousands of miles away,who employ them for many purposes, us ful and economic. The sweeper of the crossings of London, holds in his hand a broom, the fibrous portion of which was cut by the wild Indians of Brazil from the stems of a palm : the gentleman who prides himself on his Penang Lawyer, is but carrying a young plant of the Licuala acutifida. The knob of the ladies parasol, is formed from a Coquilla-nut, turned into that shape. The chip hats, so extensively worn on fine summer days, are made of the leaves of a Cuban palm (*Thrinax argentea*). Heaps of dates are to be seen in all the shops of Europe which were gathered by the Bedouin Arabs, or on the borders of the great desert of Sahara ; and cocoanuts grown on the shores of the Indian Ocean, in the myriads of islands which form its Archipelago, or on the shores of the Carribean sea, are sold in every city of the colder regions of the world, where they are ever beheld with unabated curiosity. The cordage and rigging of the ships, and the thick mattings used on stair cases in England, spun and woven, are from the husk of the cocoanut, and many articles of furniture are made from the woods of Palms. Toys and ornaments are made from the kernels of the vegetable Ivory palm. The stearic candles so well known are composed of the fatty substance extracted from the oil palm and the cocoanut. The sago which ministers so powerfully to the recovery of the sick, and which is seen in such varied guise on our tables, is the pith of palms that flourish in many tropical regions, the famous Betel nut dentifrice formed of the charcoal of that nut, colored with dragons blood, is the produce of two palms, and the toilet soaps of Europe are made from palm oils. Every where we meet with numerous products of Palms, either in a raw state, or turned by the ingenuity of man to some useful purpose ; and millions of people who never saw a palm are benefitted by the products of these useful trees. But if this be felt in remote regions of the cold north, in the tropical regions of Asia, Africa, America and Australia, where these elegant members of the vegetable kingdom flourish in all their native splendour, the inhabitants derive from them many of the necessaries, comforts, and luxuries of life, and come more or less in contact with them in almost every action of daily life. In household economy, parts of them are formed into spoons, and cups, and ladles and lamps, and hats and clothes, and combs, and hammocks, and bowstrings, and fishing lines, and fish-hooks. The light rafters of their houses are obtained from the straight cylindrical trunks of the Jara Palm (Leopoldinia pulchra), the date or palmyra tree. The roof is thatched with the leaves of palms. In one region, the door of the house is made of the split stems of the Pashiuba Palm, (Iriartea exorhiza),and in another the thickly matted leaves of the cocoanut and palmyra serve as a door for the gardens and parterres. The harpoon for catching the cow-fish, is formed of the blackwood of the Pashiuba barriguda (Iriartea ventricosa.) The people eat the fruits the produce of many of this tribe of trees, and in the palm-wine and Arracks from the various plants, they enjoy palatable refreshing and stimulating drinks.—*Seeman.*

The *Chamærops Khasiana* The fan-palm, ("Pakha," Khas.), grows on the cliffs near Mamloo on the Khasia hills : it may be seen on looking over the edge of the plateau, its long curved trunk rising out of the naked rocks, but its site is generally inaccessible : while near it grows the *Saxifragis ciliaris* of English Gardens, a common plant in the north-west Himalaya, but extremely scarce in Sikkim and the Khasia mountains. This species of Chamærops is very closely allied to, if not identical with *P. Martiana* of Nepal, which ascends to 8000 feet in the western Himalaya, where it is annually covered with snow : it is not found in Sikkim, but an allied species occurs in Affghanistan, called P. Ritcheana. The dwarf palm of Southern Europe is a fourth species.—*Hooker, Him. Journ, Vol.* II. *p.* 280. There are upwards of twenty kinds of Palm in the Khasia district, including *Chamærops*, three species of *Areca*, two of *Wallichia*, *Arenga*, *Caryota*, three of *Phœnix*, *Plectocomia*, *Licuala*, and many species of Calamus. Besides these there are several kinds of *Pandanus*, and the *Cycas pectinata*—*Hooker, Him. Jour. Vol.* II. *p.* 267. Palms of the Khassia hills amount to fourteen, of which the *Chamærops* and *Arenga* are the only genera not found in Sikkim.—*p.* 281.

(5985) PALM. The term applied in Southern India to the bars of iron, manufactured from Cutties

(5986) PALM BOOKS. The books and separate leaves employed for writing on, in Asia, are made from the leaves of the Taliput Tree *Corypha Umbraculifera*, also from the Tara, Tarjeet, or Tallier of the Bengalese *C. Taliera*, Roxb. All the Burman books are made of the leaf of a species of corypha, but the orders, that are issued from the Burmese courts are written on strips of palmyra palm-leaf.—*Mason.* Those used in Southern India for the accounts of shop-keepers, the orders of Collectors, and village accounts are made of the leaf of the palmyra.

(5987) PALMA CHRISTI. CASTOR OIL PLANT.

Jarak MALAY, & JAV.
Kaliki SUNDA & MAD :
Tangan-tangan, PHILIPPINE.

(5988) PALM OIL.

Huile de palme, Huile de Senegal. FR.
Palmol, GER.
Olio di palma, IT.
Aceite de palma. SP.

A fatty substance obtained from the fruit of several species of palms, but chiefly from that of the *Elais Guineensis*, growing on the Western Coast of Africa. It has the consistence of butter, a yellowish colour, and scarcely any particular taste ; and becomes rancid on being kept for any length of time. It is chiefly used in England for the manufacture of toilet soap, pomade-perfumery ; also in medicine and surgery. The African Palm Oil of Commerce, so much imported into England for the Manufacture of Prices' Patent Stearic Candles, is the produce of this Elais Guineensis ; Linn., a native of Africa. Another species, E. melanococca, Gærtn : is a native of America : both species might be profitably introduced into India.—*Seeman.*

(5989) PALM WINE. TODDY.

Tuwak, MALAY & JAV.
Taree Sendee & Narellie, HIND.
Nera, MALAY.
Kulloo, TAM. & TELEGOO.

The fermented juice of several species of palms.

(5990) PALM-WOODS. Two or three varieties only, of the four or five hundred which are said to exist, are imported into Great Britain from the East and West Indies. They are known in England by the names, palm, palmetto, palmyra, and nutmeg, leopard, and porcupine wood, &c. from their fancied resemblances, as when they are cut horizontally, they exhibit dots like the spice, and when obliquely, the markings assimilate to the quills of the porcupine. The trunks of the palms are not considered by physiological botanists to be true wood, they all grow from within, and are always soft and spongy in the centre, but are gradually harder towards the outside : they do not possess the medullary rays of the proper woods, but only the vertical fibres, which are held together by a much softer substance like pith or cement, so that the horizontal section is always dotted, by which they may be readily distinguished from all true woods. The colours and hardness of the two parts differ very materially, and through the kindness of Sir James Sutherland, and Colonel Sykes, are given the distinctive names of the following three :—

The *Areca Catechu*, or betle-nut palm, is remarkably perpendicular, it grows to the height of about 30 feet, and rarely exceeds 4 or 5 in diameter, it bears a small tuft of leaves, and the fruit is in clusters like grapes. The betle-nut is chewed along with quick lime and the leaf of the Piper Betle, in the manner of tobacco. The general colour of the wood is a light yellow brown, the fibres are large, hard, and only a few shades darker than the cementitious portions.

The *Cocos nucifera*, or cocoa-nut palm, flourishes the best in sandy spots near the sea beach, and sometimes grows to 90 feet in height and 3 feet in diameter, but is generally less ; it is rarely quite straight or perpendicular, and has broad pendent leaves from 12 to 14 feet long, in the midst of which is a sort of cabbage, which, as well as the fruit, the cocoa-nut, is eaten : the husk of the nut supplies the material for coir rope and matting. No part of this interesting tree is without its grateful service to the native of the Tropic, the leaves are used for making baskets, mats, and the covering of his dwelling ; he also obtains from this tree, oil, sugar, palm-wine and arrack, and although the upper part of the trunk is soft and stringy, the lower supplies an useful wood, the fibres of which are of chesnut brown, and several shades darker than the intermediate substance ; the wood is employed for joists, troughs for water, and many purposes of general carpentery. The Asiatic Society has specimens marked, male, 1st; 2nd; 3rd ; 4th sorts, and the same number of female varieties : no material distinction is observable between them.

The *Niepere palm*, Caryota urens, is much darker than either of the preceding kinds ; the fibres are nearly black and quite straight, and the cement is of a dark brown, but in other varieties with these black fibres, the softer part is very light-coloured and so friable that it may be picked out with the fingers ; Colonel G. A. Lloyd has mentioned that at the Isthmus of Darien, they use the fibres of some of the palms as nails for Joinery work.

Palmyra wood, or that of Borassus flabelliformis, says Mr. Laird, is largely imported into Madras and Pondicherry, from the Jaffna district at the northern part of Ceylon, for the construction of flat roofs, the joists of which consist of two slabs, the third or fourth part of the tree, bolted together by their flat sides so as to constitute elliptical rafters. They are covered first with flat tiles, and then with a white concrete called Chunam, consisting of shell lime, yolks of eggs, and Jaggree (Sugar), beaten together with water in which the husks of cocoa-nuts have been steeped.

The *pickly pole* (Cocos Guianensis) of Jamaica. &c., a palm growing 40 feet high, and of small diameter, is said to be very elastic, and fit for bows and rammers.—*Capt. Symonds.*

The *palm woods* are sparingly employed in England for cabinet and marquetry work and sometimes for billiard cues which are considered to stand remarkably well ; they are also turned into snuff boxes, &c. The smaller kinds are imported under the names of Partridge canes (called also Chinese or fishing canes,) Penang canes from the island of that name, together with some other small palms which are used for walking sticks, the roots serving to form the knobs or handles. The knobs of these sticks exhibit irregular dots something like the scales of snakes, these arise from the small roots proceeding from the principal stem ; which latter shows dotted fibres at each end of the stick, and streaks along the side of the same. The twisted palm sticks, are the central stems or midribs of the date palm ; they are twisted when green, and stretched with heavy weights until they are thoroughly dry : they are imported from the Neapolitan coast but are considered to be produced in Egypt. The shells of the cocoanut and coquilla-nut, and the kernels of the areca or betle-nut, and those of the corosos or Ivory-nut, have likewise their uses in English workshops.—*Tredgold.*

(5991) PALMINE may be prepared from the commonest castor oil in the country, and can possibly be obtained from other oils also, by treating them with nitric or nitrous acids. A process is given in Brande's Manual of Chemistry Vol. II p. 1257, and supposed to be the substance which has been lately patented for the use of railway carriages in this country, and whether as regards its origin, the facility of making it, the abundance of the castor oil plant in India, its consistence and cheapness; it well deserves attention. The Nitric or Nitrous acid, *Shore ka tezab* is usually obtained by distilling nitre, *Shora* ; Hind, with Sulphuric acid, *Gundhuc ka tezab* ; of which two materials various proportions are employed When Nitrous or Nitric acid is made to act upon castor oil, it is converted into a solid wax like substance, and a similar, though much more rapid, result takes place when olive oil the *Zeitoon ka tel* of the bazars, is similarly treated with Nitrate of Mercury ; but it deserves notice that castor oil is the only one of the drying oils which is susceptible of this species of solidification. On adding nitrous acid to castor oil a yellow liquid is at first formed, and the time required for its solidification varies with the quantity of acid employed ; when about a twentieth part of acid is used, it solidifies in seven or eight hours, and this or somewhat less, is the best proportion. If too much acid be used, a third part, for instance, or a half, the temperature rises to 130° or 140° ; effervescence ensues and the oil becomes opaque, and instead of indurating remains viscid. Palmine thus obtained is yellow, but when purified by solution in boiling alcohol, it is white, of a waxy fracture and requires a temperature of about 150, for its fusion. When this is kept for some months it occasionally acquires a resinous appearance and presents an almost vitreous fracture. It has appeared to me that a large and profitable trade might be had in Palmine made from the cheap oils of Southern Asia, the difficulty of transporting which is well known. The same effect is produced on this oil and on Olive oil by adding the Nitrate of Mercury.—*Author.*

(5992) PALMYRA. BORASSUS FLABELLIFORMIS.

Tar kajhar, HIND.
Panna marum, TAM.
Tatty Chettoo, TEL.

This tree is very abundant, especially in sandy tracts near the sea. It is used chiefly for rafters, joists and reapers, when of good age, the timber is very valuable for this purpose, the trunk is split into 4 for rafters, into 8 for reapers, these are dressed with an adze. Those of Jaffna Palmyrahs are famous, and were largely imported in former times. From the structure of the fibres; it splits easily in the direction of its length, but supports a greater cross strain than any other wood : iron nails, however, rust rapidly in it. The fruit and the fusiform roots of the young trees (in the Northern Circars) are used as an article of food by the poorer classes. The leaves are used for thatching and coarse fibre. Jaggery and Toddy are extracted from the Tree, the former is extensively used in the manufacture of Sugar in Vizianagrum and Rajahmundry. Very neat baskets of Palmyrah leaf are exhibited from Tinnevelly.—*M. E. J. R.* Some clean but brittle fibres were exhibited at the Madras Exhibition of 1855, by the Tinnevelly, Madura and Travancore local committees and well twisted rope accompanies most of the samples, but the material is said to be stiff, brittle, and liable to rot when wet. This substance did not appear to have undergone any preparation, and it contained so much woody fibre that it is questionable whether it would ever be suited for manufacturing purposes. Its chief uses are for securing thatch and tying bamboos. in building native huts. The dried leaves of this plant are used for writing upon with an Iron style, also in thatching, making fans, and light baskets for irrigation. The Palmira tree of Europeans (*Borassus flabelliformis*), and the *Tar* of the natives of India, is to be seen in almost all parts of India, and occasionally as far as 30° N. lat. It is stated by Dr. Roxburgh to be next to *Caryota urens*, the largest Palm on the Madras coast, and that it seems to thrive equally well in all soils and situations. The seeds, when young are eaten by the natives, being jelly-like and palatable. The tree, during the first part of the season, yields a pretty large quantity of toddy (palm wine). This is either drank fresh drawn from the tree, or boiled down into a coarse kind of rob called jaggery, or it is fermented for distillation. The wood, near the circumference of old trees, is very hard, black, heavy, and durable. By the natives the leaves are universally used for writing upon with an iron style. They are also employed for thatching houses, for making small baskets, mats, &c., and some also formed into large fans, called vissaries, Tam: The fibres of the leaves (*Palmyra nar*) are employed on the Madras side for making twine and small rope. They are about two feet in length, strong, wiry, and not unlike those of the Esparto of Spain. Near the base of the leaves there is also found a fine down, which is used for straining liquids through, and also for stopping bleeding from wounds.—*Royle, Fib. Plants, p.* 93. The palms undoubtedly constitute the noblest tribe of plants in the whole vegetable kingdom: and there is a large number of species indigenous, and cultivated in the Tenasserim Provinces. Excepting the areca and cocoanut, the palmyrah palm, is more generally diffused than any other.—*Mason.*

(5993) PALOO. A hard, fine, close grained, heavy Ceylon wood: heart-wood deep red brown, recent layers reddish yellow; its compact, even structure, indicates that it is admirably adapted for turning work.—*Exhibition of* 1851.

(5994) PALUDINIDÆ a family of Prosobranchiate Gasteropodous *Mollusca.* The species are all inhabitants of the fresh water. They embrace Lamarck's family of Peristomians. The genera included in it are *Paludina*, *Vulcata*, *Ampullaria*, *Amphibola*, and *Bithinia*. Through *Ampullaria* the family is allied with *Neritidæ.*

Paludina (Lam). —This form is widely spread. Species have been found in Europe, Asia, Africa, and America. The European species are the inhabitants of temperate climates. The number of recent species of *Paludinæ* given by Woodward is 60 and of fossil species 50.

Ampullaria (Lamarck).—*Eng. Cyc.*

(5995) PAN. PIPER BETEL. Betel Pepper. This is cultivated in spots by itself; it requires much water and care, and is too well known to need any further description here. The leaves are eaten raw. —*Riddell.*

(5996) PANAX, (intended to be formed from πᾶν, all, and ἄκος, a remedy), a genus of Plants belonging to the natural order *Araliaceæ.* The flowers are polygamous, the calyx obsolete and 5-toothed. It has 4 petals, 5 stamens inserted with the petals under the edge of the disc, and alternate with them. The fruit is succulent, compressed, orbicular, from 2- to 3-celled; the cells leathery and 1-seeded. The species are herbs and shrubs and trees, having the leaves and inflorescence variable.—*Eng Cyc.*

(5997) PANAX FRAGRANS.

Gooti-soona, HIND.

A shrub, with fragrant flowers of a green color, a native of Nepal.—*Riddell.*

(5998) PANAX FRUTICOSUM is used in China and Cochin-China as a febrifuge, and as an astringent tonic. It has a shrubby unarmed stem, pinnately decompound leaves; petiolate oval oblong leaflets, coarsely and dentately serrated, the ultimate ones deeply trifid, the panicle corymbose, with the branches umbelliferous at the apex. It is a native of the islands of Ternate, Java, and Amboyna. (Lindley, *Flora Medica*; Burnett, *Outlines of Botany.*)—*Eng. Cyc.* Commonly grown in Indian gardens, and easily propagated from cuttings.—*Riddell.*

(5999) PANAX OBTUSUM. A shrub, like the former, but not so commonly cultivated in gardens, the roots of all are said to possess medicinal qualities, and are much esteemed by the Chinese for their beneficial influence on the nerves.—*Riddell.*

(6000) PANAX PSEUDO-GINSENG. Dr. Wallich has discovered in Nipal a species of Panax closely allied to P. quinquefolius and of which he has published an account in the 4th vol. of the Transactions of the Medical and Physical Society of Calcutta, and in his *Plantæ Asiat Rarior.* vol. ii. p. 30, t. 137. Dr. Wallich names his species *Panax Pseudo-ginseng.*

(6001) PANAX QUINQUEFOLIUS Ginseng. *Syn.* Aureliana canadensis.

The roots are about the thickness of the finger, like those of parsley, of a whitish yellow colour externally, white within, two to three inches long, wrinkled, or with rings, often divided into two branches, rarely into three or four, and these presenting a slight likeness to the human form, whence the Chinese name is derived; the parenchyme is formed of a horny and compact tissue,. displaying some resinous points. Above the neck is a knotty twisted tissue formed by the remains of the old stalks. The odour is sweet, and weakly aromatic, the taste saccharine, somewhat like that of liquorice, subsequently bitter, and rather aromatic. The root of an Umbelliferous plant, the *Sium Ninsi*, is often mixed in the druggist's shops, or mistaken otherwise for the ginseng; the essential difference consists in the ginseng having the neck covered with fibrous threads, the remnants of the cortical part of the stalk. The root abounds in gum and starch, and has a little resin and essential oil. The plant is about a foot high, with glabrous, straight, simple stalks, terminating in three leaves, each composed of six uneven leaflets, a little pedicelled, oval, lanceolate, acute, and toothed at the edge. The flowers are borne on a central peduncle, and disposed in an umbel. The berries are kidney-shaped, red, compressed, crowned with the calyx and styles, and containing two semicircular seeds The ginseng root is one of the substances which, without any obvious cause, has attained the highest celebrity and esteem among mankind for its alleged medicinal virtues. The Dutch were the first nation who made it known in Europe, where they brought it from Japan in 1640. The Japanese themselves were indebted for it to China. The plant grows in the great forests of Tartary between the 39th and 47th degrees of north latitude; it is also found in abundance in Virginia and Canada, a circumstance which has rendered the roots so common that they are now cheap in China, where they once sold for their weight in gold. It would be superfluous to follow M. Fee and other authorities in the details they afford regarding the cultivation and gathering of the ginseng. The Chinese in their hyperbolical phraseology name the root, "the pure spirit of the earth," the "recipe of immortality," the "queen of plants," &c., and in short regard it as a panacea for all the diseases to which they are liable.—*O'Shaughnessy, p.* 373-74.

Five-leaved panax or *Ginseng*, has a fusiform root more or less branched, of a whitish colour, and terminating in fibres. The stem is smooth, round, and green, often with a tinge of red, divided at the top into three petioles with a flower-stalk in their centre. The petioles are round, smooth, and swelling at their base. The leaves ternate, quinate, or septenate. The berries are kidney shaped, of a bright red colour, and contain 2 semicircular seeds. The flowers are of a yellowish colour. It is a native of Chinese Tartary and North America. In China, it has been considered an invaluable drug from time immemorial. In 1709 the Emperor of China commissioned 10,000 Tartars to go in quest of as much of this root as they could find: each one was to give two pounds of the best of it to the emperor, and to sell the rest for its own weight in fine silver. The roots enter into the composition of every Chinese medicine. It is reckoned a stimulant and restorative, and both rich and poor consider it a remedy for every disease. By Europeans and Americans however it is comparatively disregarded, and looked upon as a mere succulent, similar in its qualities to liquorice; hence the question arises, is the Chinese plant the same as the North American? For we cannot regard all that the Chinese say and practise as merely imaginary. The common name of the plant, Gen-seng, Jinchen, or Nindsin, signifies 'wonder of the world,' or the 'dose for immortality;' and the Chinese firmly believe that its powers are almost miraculous.—*Eng. Cyc.* [Ginseng.]

(6002) PANDA, one of the names of the genus *Ailurus* (F. Cuv.), an animal belonging to the class *Mammalia* and the order *Carnivora.*

A. fulgens (F. Cuvier) is the only species of the genus. It was first described by General Hardwicke, who states that its haunts are about rivers and mountain-torrents. It lives much in trees, and feeds on birds and the smaller quadrupeds, and is frequently discovered by its loud cry or call resembling the word Wha, often repeating the same. Hence is derived one of the local names by which it is known. It is also called the Chitwa. It is found in the Himalaya chain of hills between Nepaul and the Snowy Mountains (Hardwicke, 'Linn. Trans.' vol. xv.). It is in Mr. Hodgson's Catalogue of the Animals observed in Nepaul ('Zool. Proc., 1834). Cuvier declares the *Ailurus* to be one of the most beautiful of quadrupeds. He places *Ailurus* among the Bears, between *Procyon* (Racoon) and the Benturongs (*Ictides*) J. F. Fischer arranges it between *Gulo* (Glutton) and *Arctictis* (F. Cuv., *Paradoxurus* and *Ictides* of F. Cuv. and Valenciennes)—*Eng. Cyc.*

(6003) PANDAN, Malay: SCREWPINE.

(6004) PANDANACEÆ, Screw-Pines, a natural order of Endogenous Plants. The species are arborescent or bushy plants, with long rigid sword-shaped leaves, resembling those of the pine apple, usually arranged in a manner so obviously spiral that they are commonly called Screw-Pines. In a natural arrangement they are classed with Endogens, among which they are, more especially in the genus *Pandanus*, remarkable for their stems forking repeatedly. Their flowers have the sexes separate, and quite covering the spadix on which they grow. The male flowers consist of single stamens with 2-celled anthers; the females of naked 1-celled ovaries, with solitary ascending or numerous parietal ovules. The fruit consists of a mass of ovaries collected into a tuberculated head, and either dry and fibrous or fleshy and succulent. These plants chiefly abound in the Mascaren Islands and in the Indian Archipelago. of which they form a conspicuous feature. The species of *Pandanus*, Vaquois, or Screw-Pine, are readily known by their spiral leaves, dichotomous habit, and the long roots emitted by the sides of their trunk for the purpose of holding it down in the loose sand among which they grow, in order to assist in which each root is furnished with a partial exfoliation of the end, which, in the form of a cup, adheres to the root, for the purpose, as is supposed, of holding water during the period that the root is passing through the dry air. The genus *Freycinetia*, on the contrary, is composed of plants with long scrambling or rooting stems, not branching like *Pandanus*, indeed seldom becoming what can be called a tree; and, when in flower, adorned with gaily coloured spathes from which the young inflorescence protrudes. Some of the species yield seeds which are edible. The order contains 7 genera and 74 species.—*Eng. Cyc* The Screw Pines, are remarkable for their gigantic Bromelia-like leaves, arranged in a spiral manner. Though abounding most in Mauritius and Bourbon, species are also found in the southern parts of India, as well as in the Straits and Burmah. "The leaves are composed of tough longitudinal fibres, white and glossy, which enable them to be employed for covering huts, making matting, as well as for cordage, in the South Sea Islands; and in Mauritius for making sacks for coffee, sugar, and grain." ('Himal. Bot.' p. 408.) The species which is best known in India is the *Keora* or *Ketgee*, the Kaldera bush of the Madras Peninsula, called *Pandanus odoratissimus* by botanists, on account of the exquisite perfume of its flowers. Dr. Roxburgh ('Fl. Indica,' iii, p. 741) has, under this plant, mentioned the uses to which the species most common in the Mauritius is applied; which, as well as some of the other species, is known there by the name Vacoa or Baquois. It appears to be the *Pandanus sativus* of Du Petit Thouars, but which Mr. Henley mentions as *P. Vacoa*. He having observed the valuable uses to which the plant was applied in the Mauritius, recommended its introduction into India; in some of the dry southern parts of which, it would, no doubt, though slow of growth, be a valuable acquisition, from the facility with which good sacking may be manufactured from its leaves. Mr. Henley describes this most useful Vacoa of the Mauritius to grow to the height of thirty feet, when permitted to do so; but in general, the cropping of the leaves, which commence in the third year, keeps the plant down to the height of from six to ten feet. The plant is remarkable for the aerial leafless roots which it sends down as supports for its stem, and which are of so fibrous a nature as to be employed for making paint brushes for common purposes. The leaves are cut every second year, beginning when the plant is three years old, and each plant yields enough for two large bags. The preparation must begin with the leaves immediately they are removed from the trees, and consists, first, in splitting the leaves into fillets, which are from three fourths to one inch broad at the base, but they taper to a point, and are from three to four feet in length. One of them will support the weight of a bag of sugar, or about 104 lb, without breaking. Mr. Henley states that the leaves of the other species with which he is acquainted are comparatively weak. ('Jour. Agric. Soc. of India,' 1843, p. 92)—*Royle, Fib. pl. p.* 35.

(6005) PANDANUS, a genus of Plants, the type of the natural order *Pandanaceæ*. This name is derived from the Malay Pandang, and that of a genus of Plants, from which the natural family of *Pandanaceæ*, or Screw-Pine tribe, has derived its name, being so named from their leaves, which resemble those of the pine-apple, and are inserted spirally along the stem. The species are found in the islands of the tropical ocean, in those of Mauritius and Bourbon, as well as in the southern parts of India. One species, *P. odoratissimus*, being highly fragrant, is much esteemed in all Asiatic countries, either where it will grow or where its essence is known. It is constantly referred to by the Sanscrit poets, as may be seen in Wilson's 'Hindu Theatre,' by the name Ketaka, and as the Keora and Ketgee of the Hindoos. The Arabs call it Kazee, and Avicenna describes it under the name of Armak. Oil impregnated with the odour of its flowers and the distilled water are highly esteemed both for their odour and their medicinal use as stimulants. Dr. Roxburgh states that it is the tender white leaves of the flowers, chiefly those of the male, which yield the very delightful fragrance for which this plant is so celebrated. This species is common in the peninsula of India, where it is called Caldera Bush; in Mauritius it, as well as other species, is known as the Vaquois Plant: in Otaheite, a species is called the Wharra Tree, being in all highly esteemed for its odour, as well as for the useful purposes to which it may be applied. The lower pulpy part of the drupes is sometimes eaten, as is also the terminal bud, like that of the cabbage-palm, and likewise the tender white base of the leaves, either raw or boiled. during times of scarcity. It forms an excellent hedge, but occupies too much space. The roots are composed of tough fibres, which are used by basket-makers to tie their work, and are soft enough to be employed as corks. The leaves are composed of tough longitudinal fibres, white and glossy, a quality which adapts them for covering huts, making matting, as well as for cordage in the South Sea Islands, and in Mauritius for making sacks for their coffee, sugar, and grain.—*Eng. Cyc.*

(6006) PANDANUS. HIGHLAND SCREW-PINE. Smaller and finer mats in common use are fabricated from the leaves of this species of screw-pine, that grows, in Tenasserim, on the highlands above tide-waters.—*Mason.*

(6007) PANDANUS FURCATUS. LOWLAND SCREW PINE. The large coarse mats in universal use in Tenasserim, are made from the leaf of a species of screw-pine, that grows abundantly on the lowlands near tide-waters.—*Mason.*

(6008) PANDANUS ODORATISSIMUS, CALDERA BUSH, Lin.

Talay ella, TAM.
Kewoore Ka Paut, DUK.
Moghenakoo, TEL.
Kaida, HORT. MAL.
Keteka, SANS.
Keora, HIND.
Kea kaida, BENG.
Kildaro, RHEED.

Its Flowers.

Talum poo, TAM.
Keoore Ka pool, DUK.
Mogili poo, TEL.
Katuca, SANS.

Magulick is the Telinga name of the male plant and Goz doogoo that of the female. Kaldera is the name they are known by amongst Europeans on the coast of Coromandel. It is a native of all the warmer parts of Asia: all soils and situations seem to suit it equally well; it flowers chiefly during the rainy season. This plant is much employed to make hedges, for which it answers well, but requires too much room. It grows readily from branches which renders it rare to find the full grown ripe fruit. The lower yellow pulpy part of the drupes is sometimes eaten by the natives during times of scarcity and famine; the tender white base of the leaves is also eaten raw or boiled, during the same melancholy periods. The fusiform roots already mentioned are composed of tough fibres which basket makers split and use to tie their work with, they are also so soft and spongy as to serve the natives for corks. The leaves are composed of longitudinal, tough, useful fibres like those of the Pine Apple. This plant is of extensive use in most parts of the island of Mauritius for its leaves, which are employed for the purpose of package bags for the transportation of Coffee, Sugar and grain from one place to another and for exportation. The preparation of the leaves for working into matting is simple and short: as soon as gathered, the spines or their edges and dorsal nerve are stripped off, and the leaf divided into slips of the breadth proper for the use they are required for: this operation is performed with the blade of a common straight knife, they are then laid in the sun for a few hours to dry when required for working into mats, the slips are passed under the blade of a knife applied with a moderate pressure to remove all asperities on their surface which gives them a polish and makes them plain and more convenient to the hands—*Rox.* The Natives are fond of the scent of the flower which they place among their cloths. I was assured in the District of Ganjam, that the flowers are frequently tenanted by a small and very venomous Snake.—*Rohde M.S.S.* This plant grows abundantly in Travancore along the backwaters and canals, the fibres are extensively used, being good and strong.—*M.E. of* 1857. With the Leaves of the caldera bush, the Natives of lower India (like the inhabitants of the Friendly islands) make a fine kind of mat to sleep on, which they stain yellow and red with Cassia leaves and Vattinga cuttay. They are also used to make the common kind of umbrellas, called by the Tamools Talay elley kedri. Dr. Roxburgh, in his "Coromandel plants," tells us that the yellow, pulpy part of the drupe of this plant is sometimes eaten by the Indians, in times of scarcity. He adds, that the fusiform roots are composed of tough fibres, which basket makers use to tie their work with. They are, at the same time so soft and spungy as to be employed as corks.—*Ain's Mat. Med. page* 145. It is in mats of these leaves, that the fine furnitures of Madras are packed.—*Nobis.* The male flowers of the fragrant pandanus or screwpine, are exceedingly fragrant, and great favourites with the Burmese. The palm-like shrub that bears them, dropping roots from its branches, like the banyan, is a very curious plant, and not inelegant.—*Mason.* This very fragrant flower which is of a pale yellow colour is offered up at the shrines of Mariama (Mariatale) and Vishnoo, but is supposed not to be acceptable to Sheva.—*Ains. Mat. Med. page* 159.

(6009) PANDANUS SAIL-LEAF. On many of the Burmese boats, sails are seen made of large narrow leaves, sewed together. They are the leaves of a species of screw-pine that has a trunk like a palm, which is very abundant and usually grows near the sea. The fruit is used by the Karens to hackle their thread.—*Mason.*

(6010) PANEOLA PLUM. Flacourtia Sapida.

(6011) PANDION. [FALCONIDÆ.]

(6012) PANDORA. [PYLORIDÆ.]

(6013) PANGIACEÆ. *Pangiads*, a natural order of Diclinous Exogenous Plants. This order embraces three genera, the species of which are trees with alternate stalked entire leaves, polypetalous axillary monœcious flowers, with scales in the throat of those bearing pistils. The stamens are five, the seeds large and oily. Dr. Lindley says, "What the distinction is between these plants and Papayads, except that the last are monopetalous, and have no faucial scales in the ♀ flowers, it is hard to say." The species are found in the hotter parts of India. They are all poisonous. The natives of India employ extensively in medicine the seeds of *Gynocardia* *odorata*, which are known by the name of Chaulmoogra and Petarkura. The genus *Hydnocarpus*, formerly referred to *Flacourtiaceæ*, belongs to this order. [FLACOURTIACEÆ] (Lindley, *Vegetable Kingdom.*)

(6014) PANGOLINS, a name in common use to designate the Scaly Ant-Eaters, said to be derived from the word Pangoeling which signifies in the Javanese language, according to Seba, an animal which rolls itself into the form of a ball. The Bengalese name is Badjarkita, or 'reptile of stone.' These animals form the genus *Manis* of Linnæus. The Pangolins are toothless, and furnished with a very extensible tongue; but their tegumentary covering is very different, for their body, limbs, and tail are clad in a panoply consisting of great trenchant scales overlapping each other like tiles, so as to form a sort of scale armour when the animal is on its feet. When it is vigorously attacked, and often on the first approach of danger, it rolls itself up in the shape of a ball; and then the trenchant scales are said to be erected, and offer their sharp edges to the enemy.

(6015) *Manis* has the following characters: — Lower jaw very small; tongue very extensible. Body and tail entirely covered above with large triangular trenchant scales disposed quincuncially, and overlapping each other like tiles. Toes five, armed with robust claws. Body endowed with the faculty of rolling itself up more or less into the form of a ball, Dental Formula, 0. The Pangolins, are slow in motion, and live on worms and insects, especially termites and ants, which they seize by means of their extensible and glutinous tongue.

(6016) *Manis pentadactyla* (*M. brachyura* of Erxleben and probably the Phattage of Ælian, xvi. 6), Indian, Broad-Tailed, or Short-Tailed Manis. It has the head small, pointed, and conic; muzzle elongated and narrow. Body rather stout. Tail short and very broad at its base. Dorsal scales disposed in longitudinal rows to the number of eleven; under part of the body, head, and feet naked; some long, fair-coloured hairs spring from under the scales. Middle claw of the fore feet far exceeding the others in its proportions. It is a native of the East Indies, coast of Tranquebar, &c. It feeds much on termites, or white ants, for the destruction of whose conicale nests the great middle claw is admirably adapted. Thunberg states that it is found much in Ceylon, especially near Negumbo. The Dutch call it the Negumbo Devil, and the Cingalese, Caballe. Its flesh was given to the sick to eat by way of remedy. Thunberg further informs us that the inhabitants have a method of making a hole in its skin with a knife, and thus of guiding and governing the animal at their pleasure, the point of the knife, which is kept in the hole, goading and irritating him. The cruelty of this proceeding does not however seem to have struck the traveller. The Land-Carp is also an Asiatic name for this species. It is the Kuwlee Manjar, or Tiled Cat, of the Mahrattas, according to Colonel Sykes, who notices it as very common in Dukhun (Deccan), and living on white ants. Mr. Hodgson, in his catalogue of the quadrupeds of Nepaul, mentions a new species of *Manis* allied to *M. Javanica* (Desm.), as being of frequent occurrence in the hills of the lower region, and in the mountains of the central tract. ('Zool. Proc.,' 1830, 1831. and 1834)—*Eng. Cyc.*

(6017) PANICHE, the Tamil and Portuguese names of a tree which grows in Ceylon and Travancore, from thirty to sixty feet high, and ten to twenty-four inches in diameter. In Ceylon it grows tall and straight, in Travancore it is not more than twenty feet high, and is curved. It produces a fruit which resembles externally the small russet apple: when pressed it yields a very glutinous juice, which is used as a substitute for glue; and may be considered in that country as very superior to glue for the use of joiners. In Ceylon this tree is converted into masts, yards, &c. for country vessels; and the native carpenters consider it the best sort of all the jungle woods for that purpose.—*Edye, Ceylon.*

(6018) PANICUM, a genus of Grasses the name of which is applied to one of the species (Millet) by the Romans, and which, Pliny states, is so-called from its flowers being in a panicle; though others derive the name from 'panis,' bread, from its uses as such. The genus contains a very large number of species, which abound in the hot parts of the world, though a few extend to higher latitudes and ascend the cool mountains of hot countries. They are chiefly valuable as pasture grasses, and for their seeds, which forms a large portion of the food of the poorer classes of many nations, and thus engage a considerable share of the attention of the agriculturists of those countries. The genus *Panicum* is distinguished by having a 2-flowered spikelet, with the lower flower masculine or neuter, and the upper hermaphrodite. Glumes 2, unequal, concave, blunt. Masc. paleæ 2, stamens 3, sometimes neuter, the upper palea and the stamens abortive. Fertile flowers, paleæ 2, unequal, concave, the lower one embracing the upper; scales 2; stamens 3; styles 2, ovary sessile. Besides those mentioned below, which are the most commonly cultivated species, the grains of other species of *Panicum* growing in a wild state are collected, and form articles of diet with the poorer classes of the natives of India, as o *P. floridum* (Burtee), *P. Helopus* (Koorae), *P. hispidulum* (Dhand). The uses of this genus are not confined to its grain, for the herbaceous par of several species forms the most valuable pasture grasses of the hot countries both in the Old and New World. Some of the species o

Panicum of the Brazils are of gigantic stature, and yet tender and delicate in their herbage. The Coapim de Angola of Brazil grows 6 or 7 feet high, and other equally gigantic species constitute the field crops on the banks of the Amazonas ; while *P. maximum*, or Guinea Grass, forms the mo-t valuble pasture for cattle in Jamaica. This is said to have been introduced into that island from the coast of Africa, the seeds having been transmitted as food for some birds which were sent to Chief Justice Ellis. The straw of several of the species is esteemed as fodder for cattle in India, but no pasture grass in any country is probably more highly thought of than the Doob of India, which by the Brahmins is held sacred to Ganesha (Janus?) under the name of Doorsah. This is fortunately common throughout India, and forms probably three-fourths of the food of their horses and cows. It is seldom cultivated ; but Europeans, in the northern parts, frequently form lawns by planting small pieces of this grass, which forms excellent hay. The usual mode of obtaining it is to send out the grass cutters into the uncultivated parts of the country, who scrape off the ground the creeping stems and leaves of this species, which is easily distinguished by its smooth and creeping habit ; its spikes being fascicled and digitate, filiform, from 1 to 2 inches long, with the flowers disposed in two rows on the under side. It is the *P. Cynodon dactylon* of botanists, and occurs also in England.—*Eng. Cyc.*

(6019) PANICUM FRUMENTACEUM, the Shama or Samwuk of the natives of India, is a wholesome and nourishing grain, and forms there an article of diet, chiefly of the lower classes. There are several varieties of it, which yield from 50 to 60 fold ; it delights in a light, tolerably dry, rich soil ; the same ground yields two crops between the first of the rains in June, July, and the end of January, in the Circars, but only one erop in the northern provinces.

(6020) PANICUM ITALICUM. Setaria italica, *Kunth.*

Kungoo, Beng.
Kala-kangnee, Hind.
Tenney, Tam.

India : cultivated in Europe. Seeds small, roundish, straw-coloured, pericarp brittle, with a round and partially pellucid grain, alimentary, but gives a heavy,disagreeable bread.—*O'Shaughnessy, page* 637.

(6021) PANICUM MILIACEUM, Millet. Common Millet. Lin. Κεγρος, Hesiod, Diosc. Hippoe.

Chamy, Can.
Savec, cheena-waree, Hind.
Varugoo, Tam.
Shamakh, Duk.
Samaloo, Tel.
Millet. Eng.
Panicum Miliaceum
Shamaka, Sans.
Ainslie, page 217.

Millet, is the best known species, being cultivated in the south of Europe as well as in tropical countries. Two varieties are well known, one brown, the other yellow-coloured, imported from the Mediterranean chiefly for feeding poultry, but forming in the south of Europe as well as in India a portion of the food of the inhabitants. In the latter country it is cultivated in the cold weather with wheat and barley, and the only one of the small grains that is so at the season of the year.—*Ainslie. Eng. Cyc.*

(6)22) PANICUM MILIARE, is another species generally cultivated on an elevated rich soil in the peninsula of India : the seed is one of the sorts of dry or small grain which forms an article of diet of the Hindoos,who inhabit the higher lands, and cattle are fond of the straw.—*Eng. Cyc.* Cultivated in Europe, seeds oval, slightly compressed, brilliant, about a line in length ; bark or envelope blackish, brown or fair; parenchyme, white, or sweet taste. Alimentary, but the pericarp is very difficultly separated from the grain ; chiefly used in a kind of gruel or bouillie.—*O'Shaughnessy, page* 637.

(6023) PANICUM. Panic grass. Several very common grasses belong to the genus panicum. One species in Tenasserim grows about three feet high, and after a field has been subdued, it will often spring up so thick that every thing else is destroyed. Cattle eat it both dry and green.—*Mason.*

(6024) PANICUM SEMIVERTICILLATUM. Rottler.

Koodraywalie chamay Tam. | Lupta Hind.

This is an inferior grain to several of those hitherto mentioned and is eaten by the poor people in the districts in which it is cultivated ; such as Coimbatore, and other dry grain countries.—*Ainslie, p.* 219.

(6025) PANMUHORI. Seeds of Fœniculum Panmorium.—*Ben. Phar.*

(6026 PANNAM KALUNG. The people of Southern India and Ceylon have for many hundred years been in the habit of eating the bulb or root, which is the first shoot from the palmyra nut which forms the germ of the future tree, and is known locally as pannam kaling. It is about the size of a common carrot though nearly white. It forms a great article of food among the natives for several months in the year ; but Europeans dislike it from its being very bitter. Recent experiments have proved that a farina superior to arrowroot can be obtained from it, prepared in the same way, and 100 roots, costing 2½d, yield one and half to two pounds of the flour.—*Simmonds' Comml. Products, p.* 376. In Madras, 100 cost 1½d.

(6027) PANRI. Leaves of a small plant imported from Bombay, considered refrigerant and to promote digestion: are sweet-scented and used by attars; one seer costs one and a half rupees. —*Genl. Med. Top. p.* 149.

(6028) PAN SOOPAREE, from *Pan*, betel leaf, and soopecaree, areca nut; see BETEL.

(6029) PANSY, HEARTSEASE. May be raised from seed, sown at the commencement of the rains, will hardly repay the trouble.—*Jaffrey.*

(6030) PAPAVER, a genus of Plants the type of the natural order *Papaveraceæ*. The history of this, like that of many other cultivated plants, is little known, as well as the time when it began to be cultivated for the sake of its inspissated juice, though it was well known to the Greeks, and cultivated at very early periods on account of its seeds. (Theoph., lib. ix. cap. xiii., ed. Bodæus and Staple, p. 1097.) Some authors are of opinion that it is the Μήκων of Dioscorides, and that the kind with black seeds was called' Αγρία, and that with white seeds Ημερος; and that it is the juice of this plant which Hippocrates recommends under the name of ὀπὸς μήκωνος or 'juice of the poppy.' Pliny (xx. c. 18) uses 'opium' to express the inspissated juice of the poppy. Sprengel, in his 'Hist. Rei Herb.,' i. p. 176, quotes Diosc., lib. iv. c. 65, as referring to *Papaver somniferum*, and to *P. Rhæas*; but in his edition of that author (ii. p. 600) he mentions only the latter plant; hence we may infer that he conceives the former to have been unknown, as he nowhere else mentions it. We do not in this instance get the same degree of assistance as in many others from Arab authors. Opium is described by them under the name of Afeeyon, while Apaynum is quoted by Dr. Ainslie as its Sanscrit name. The poppy plant is described by the Arabs under the name of Khushkhush, while the Sanscrit is Chosa; and the Persian and Hindoo, Post. The species of *Papaver* are chiefly found in European countries; but a few species expand to the Caucasus and Armenia, and one species grows in the Himalayas, though Egypt is the country where we find the earliest notice of the opium poppy. This species is now common in most parts of Europe, but having been so long cultivated, it may appear indigenous in many countries where it has only escaped from cultivation. It is, as is well known, extensively cultivated in India, but it can nowhere be seen in a wild state, as the climate is too hot to support it, except for a few months in the year. The genus *Papaver* has two convex deciduous sepals; petals 4; stamens numerous; style wanting; stigmas 4 to 20, radiating and sessile upon a disc which crowns the germen; capsule obovate, 1-celled, opening under the crown of the stigmas with short valves; placentæ intervalvular, incomplete; flower-stalks inflexed at the apex before the flowers have expanded; the flowers of all are large and showy, but last a short time. Herbaceous plants abounding in milky juice. The species are numerous. The English species are distinguished as having a rough and a smooth capsule; of the former, *P. hybridum* has an obovate globose capsule, and *P. Argemone* an elongated club-shaped capsule; of those smooth capsules, *P. Rhæas* and *P. dubium*, the former has a globose and the latter an oblong capsule.—*Eng. Cyc.*

(6031) PAPAVER CROCŒUM. This species, which is almost always variegated, is sown only as a border flower, for its large and handsome appearance The scent is anything but agreeable. The seed should be sown where the plants are to remain, and six inches the least space allowed between each plant. They do not bear transplanting. The common cultivated species, from the capsule of which opium is procured, is of various colours, and when sown in beds, has a very pleasing effect. The seed (kus kus) is usually used by natives in confectionery having the taste of sweet almonds. Is propagated by seed only,--*Riddell.*

(6032) PAPAVER RHŒAS, (corn poppy). This unimportant species is found in gardens in upper India. The petals are of a beautiful red colour, and are used to colour a syrup, the Syrups rhoæados of the English pharmacopœia; no active or narcotic principle has been found in this species.—*O'Shy., p.* 171.

(6033) PAPAVER SOMNIFERUM, OPIUM POPPY. Linn, The Garden or white Poppy. var. *a* with black, var *b* with white seed.

Post, HIND
Khuskush, ARAB. and DUK.
Koonar, PERS.
Chosa, SANS.
Μμκωυ GREEK.

It appears to have been one of the early cultivated plants, as Homer is thought to allude to it as growing in gardens. Hippocrates mentions two kinds, the *black* and *white poppy*, so the Arabs and Persians distinguish the *khushkhash abiuz* or white, from the *khuskhash aswad*, or black poppy. The white Poppy is now cultivated in the plains of India, and the black, or rathe deep-red, variety in the Himalayan mountains Mr. Hamilton says, "The opium is chiefly obtained from the single white poppy; I have als seen the red and purple colours though only on is usually seen in a field. I hardly remember t have noticed any mixture of colour in one piec of ground. The kind here cultivated generall grows to a height of three feet."--*Hamilton, Tra vels in Asia Minor p.* 115. It was early cultivat ed, as it still is, in Egypt, also in India, Persia Asia Minor, as well as in some parts of Europe The Garden Poppy is probably a native of Persia It has, however, been so long grown in garden in various parts, that it is sometimes found appa rently wild, especially in the southern parts c Europe. The roots are from 2—4 feet high, th stems are round and straight, glaucous, smooth with a few hairs towards the white and taperin extremity, and on the peduncles. The leaves are large sessile, amplexicaul, smooth, of a glaucous green, margins wavy, cut and toothed. The flowers are large and terminal, drooping before flowering, with smooth concave sepals; 4 large petals, roundish in form, white or of a purplish colour with a darker coloured spot near the claws. The capsule is oval, or nearly globose, large, smooth, with parietal placentæ equal in number to the stigmas, which are covered with numerous white or brownish coloured, kidney-shaped seeds. Flowers in June and July, and the capsules ripen about two months later.—*E. B.* 2145. Some consider that there are two distinct species instead of varieties of this plant. *P. Officinale.* (Gmelin, var, *album* is larger and less glaucous, with white petals and seeds, capsules ovate-globose and remaining closed under the crown of stigmas while *P. somniferm* (Gm.) var. *nigrum* has the flowers violet or red, seeds black, capsules globose, opening by foramina under the stigmas. The White Poppy is a native probably of Asia Minor, or of some part of the Persian region of botanists, but having been so long cultivated, is found wild in many parts of Europe The species is distinguished by its obovate or globu- ar capsules, smooth as well as the calyx, the stem smooth and glaucous, leaves embracing the stem incised and repand, with sub-obtuse teeth. There are two distinct varieties, which by some botanists are considerad to be distinct species: he dark, the red-flowered, and black-seeded is called by Gmelin *P. somniferum*; and the white lowered with white seeds, *P. officinale.* The lat- er is characterised as having an ovate globose capsule; foramina under the stigma either none or obliterated; peduncles solitary. The former *P. somniferum*) has globose capsules, opening by oramina under the stigma; seed black; pedun- les many. The flowers are usually red of dif- erent tints, though sometimes white. Dr. Royle tates that he has seen only the white-flowered ariety in the plains of India, and the red- owered in the Himalayas, and both cultivated or the sake of the opium. The poppy is cul- vated in many parts of Europe on account f its seeds, which yield a bland oil much es- eemed in France; and in England chiefly n account of the capsules, which are used edicinally. It is extensively cultivated in Tur- ey and Asia Minor, Egypt, Persia, and India, n account of its inspissated juice, so well known s opium, though this is occasionally prepared lso in Europe. The cultivation of the poppy is ery simple, though the weeding requires care, nd the plants must not be crowded too much to- ether. They are carefully watered and manur- l, the watering being more copious as the period f flowering approaches, and until the capsules e half grown.—*Eng. Cyc.*

This most important plant is a native of the south of Europe and Asia Minor, and is now naturalized by cultivation in India. The *Capsules* are employed in medicine for the preparation of a sedative decoction and syrup, much used for children. They are devoid of odour; of slightly bitter taste. If collected before the concrete juice is removed the capsules contain a minute portion of all the active principles of opium; for medicinal purposes those should be rejected which are marked with longitudinal and paralled cuts resulting from the extraction of opium. An infusion of poppy heads in cold water should strike a red colour with permuriate of iron—*O'Shaughnessy, page* 171.

Poppy Oil.—The seeds of the poppy yield by expression 56 per 100 of a bland and very valuable oil, of a pale golden colour, fluid to within 10 degrees of the freezing point of water, Sp. Gr. 939; it dries easily, is inodorous, of agreeable flavour, is partially soluble (8 in 1000) in alcohol, dissolves the oxides of lead. The mass from which the seed is expressed is found to be extremely nutritious to cattle; for all pharmaceutical purposes, this oil is equal to that of the olive, employed in European pharmacy, and accordingly recommended in Dr. O'Shaughnessy's formulæ for Hospital use.—*O'Shaughnessy, Eng. Cyc. page* 172.

Opium is an invaluable remedy, and important article of commerce, and requires to be treated of in considerable detail and reference is made to the article OPIUM.

(6034) PAPAVERACEÆ, *Poppyworts*, a natural order of Hypogynous Exogenous Plants. The species are readily known by their deciduous calyx, usually tetramerous flowers, indefinite hypogynous stamens, and parietal placentæ; added to which, they have leaves without stipules, and their stems discharge a turbid white, yellow, or orange-coloured juice when wounded. Their seeds moreover contain a bland oil, lodged in a copious albumen, within which is stationed a minute embryo. They consist for the most part of herbs, which are usually of only annual duration; but a few are shrubby, the most remarkable case of that kind being a genus called *Dendromecon* a native of California, which is a true shrub, with the aspect of a *Cistus.* The greater part of the species inhabit the temperate parts of the Old World; but a few also occur in Australia, at the Cape, and in South America. Their active qualities are usually deleterious, but are for the most part of little moment, except in the case of the *Papaver somniferum*, or Opium Poppy. It is however probable that in most cases the milky juice is narcotic, and the oil of the seeds harmless. An apparent exception to the latter statement occurs in *Argemone Mexicana*, the seeds of which are said to be narcotic, especially when smoked ; but it is probable that in this case it is in the coats of the seed that the poisonous principle resides, rather than in the oil itself. Some *Papaveraceæ* have no petals, as *Bocconia*, thus corresponding with *Thalictrum* and other apetalous *Ranunculaceæ*, with which order they are closely connected through *Platystemon*, a Californian annual with disjointed carpels. They are also related to *Nymphæaceæ* and *Sarraceniaceæ*. The order embraces 18 genera and 130 species.—*Eng. Cyc.*

(6035) PAPAW, CARICA PAPAYA. This is the American pawpaw, not the pawpaw of the Mississippi valley, *Porcelia triloba* ; but the pawpaw of South America and the West Indies. Europeans call it papaya, from the Portuguese *papayo* ; and by the Portuguese it was probably introduced into India, The fruit resembles a melon in appearance, and often tastes no better than a good English turnip. —*Mason*. The fruit and leaves of the papaw, or Muh-Kwa.tree melon, are eaten, after being cooked ; the Chinese are aware of the supposed intenerating property of the exhalation from the leaves of this tree, and make use of them sometimes to soften the flesh of ancient hens and cocks by hanging the newly killed birds in the tree, or by feeding them upon the fruit beforehand.—*Williams' Middle Kingdom, p.* 284.

(6036) PAPAYACEÆ. *Papayads*, a small natural order of Exogenous Plants. The species are apparently allied to *Cucurbitaceæ* and *Passifloraceæ*, with the former of which it corresponds in its gourd-like fruit, with parietal placentæ, and in its disunited sexes ; while it approaches the latter also in placentation, in its superior succulent fruit, and in the structure of its seeds. The order is remarkable in its fructification for having monopetalous male flowers and polypetalous females, and in its vegetation for its simple unbranched stems, growing only by the gradual development of a terminal bud. The species of most importance in this order is the Papaw-Tree, *Carica Papaya*. The order as at present constituted contains 8 genera and 25 species.—*Eng. Cyc.*

(6037) PAPEETA : NUT OF Strychnos Sancti Ignatii *Ben p.* 219.

(6038) PAPER.

Karta,	ARAB.	Kaghas,	PERS.
Papiers,	DUT.	Kaedum,	TAM.
Papier,	FR.	Kakitum,	TEL.
Papier,	GER.	Papel,	PORT.
Kaghuz, Kaghul. Gez	HIND.	Bumaga,	RUS.
Carta,	IT.	Papel.	SP.
Charta,	LAT.		

In histories of the manufacture of paper, the Chinese are generally acknowledged to have been the first to have made paper from pulp. The Egyptian paper, or Papyrus, was made by gumming slices of vegetable tissue together under pressure, and what is called the Rice paper of China consists only of thin slices of cellular tissue of a plant. The Arabs are supposed to have learnt the art in the eighth century from the Chinese, but much more probably from the Hindoos, as they translated many of their works and adopted much of their science. The Arabs are further said to have introduced the art of paper-making into Spain in the ninth or tenth century. Paper was first made at Nuremburg in the year 1390, but in England not till the year 1450. There is no doubt however, that the manufacture of paper from pulp has been known in China from very early times : it is said for at least 2000 years. They employ a vast variety of fibrous substances for this manufacture, and apply paper to a variety of uses little thought of in other countries. They make up an infinite variety of kinds, from the coarse, heavy, half-inch thick touch-paper, for retaining a slow, enduring fire, to the beautiful so-called India paper suited for the finest proof engravings. In the tea chests there is a lavish use of many thicknesses of paper. If a hut or boat is leaky over-head, the bed is protected by a large sheet of oiled paper. If a shopkeeper wants to tie up a parcel, he seizes a strip of tough paper, and by rolling it on his thigh at once converts it into a strong pack-thread, and even a torn sail is at times patched with tough paper. In China it is the cheapest of materials in daily use, and the manufactures are very numerous. They make it of Rice straw, of young Bamboos, of different fibres, and of the bark of the Paper Mulberry ; showing that the inventors of the art make use chiefly of unwoven fibres, though they also employ refuse cloth and silk, &c. So India, though hardly ever mentioned in histories of the art, is a country where considerable quantities of paper are made, though not generally of a good quality, as the thick ink in use does not so much require this. There are small manufactories of it in most parts of the country, and to a considerable extent at such places as Ahmedabad, Lucknow, Aurungabad, &c As will have been seen in these pages, a great variety of fibres, such as Jute, Sunn, Ambaree Moorva, and old sacks and fishing nets are als employed, though in general the natives of India prefer the Sunn fibre. The Himalayan process wit the inner bark of the Paper plant very muc resembles that of the Chinese with the Pape Mulberry. It is probable therefore that the a was introduced from that country into the Himalayas, and not from India, into which it ha probably been carried at a very early period, an from thence learnt by the Arabs ; who wou hardly else have used Cotton, an Indian produc The Hindoos themselves, according to Professo Wilson, still used, about the beginning of th Christian era, or as late as the age of their Dr mas, the inner bark of the *Bhurja* or Bir (*Betula Bhojputtur*) for writing on. In t Southern regions of India the leaves of the Pa

SCHOOL

mira and of the Talipat are well known to have been long used, as they still are, for writing on with a style. But the manufacture of paper from pulp has long been established in India, md before the Arabs began to make translations rom the Sanscrit, at the same time that they lid so from Greek writers. Dr. Buchanan, in is survey of the lower provinces of the Bengal Presidency, has given an account of the manu- acture of paper from Pat or Jute (*Corchorus litorius*) at Dinagepore, and in Behar, &c., from unn (*Crotalaria juncea*). It is also so made n other parts of the country, as well as from Hibiscus fibre. And there can be no difficulty n doing so with the other numerous fibrous ma- erials which India produces in such vast varie- y. It is objected by manufacturers of paper hat pulp from unwoven fibres does not raw through the present machinery so well s that made from rags. A modification of achinery would remedy this. But it is pro- able that if the half-stuff were made from the ean bark without first separating the fibres, ese might probably be so entangled as to an- ver some of the effects of the weaving. As rags ave to be collected, cut, cleaned, and bleach- l, Dr. Royle thinks that the primitive method using the bark of suitable plants and trees ill afford both a cheap and an effectual substi- te. Besides which, the supply of rags must me short of the increasing demands of the orld for paper. Bengal and the east coast of the y of Bengal, as well as the Malabar or west ast of India, are the places where the growth suitable materials, from the warmth and mois- re of the climate, is most abundant, and the con- yance by sea is at the same time most easy. Arracan the price of Bast, even made into pe, is but one rupee per maund, and Mr. nley observes that "it is to India we must ok for extensive and cheap supplies, for it is ere alone we find the necessary conditions of y low-priced and intelligent labour, with an undance of elementary suitable materials; and it as articles of small price are particularly nsitive of charges, such as of freight, &c., it is y by large operations that an average of low rges can be accomplished." Suitable materi- being abundant, he proposes that it should reduced to the state of half-stuff by the aid the Dhenkee, already mentioned as an trument to be found in almost every house in ngal, being used for husking rice, the prepara- n of tobacco, of drugs, stuffs, and brick dust. he method proposes to avail itself of one of ir own simple arts; it brings the question as rly as possible to the state of a domestic in- stry, ever the most economical in such coun- es; it reduces to the lowest point the charge collecting from extensive districts the various mentary matters which might present them- ves." Dr. L. Playfair, observes, that the price of 2*d.* to 2½*d.* per lb. for a partially prepared pulp, is by most makers considered to be too high, and that materials should be looked for at 1*d.* to 1½*d.* per lb. roughly prepared pulp; but if bleached or in as far an advanced state with regard to colour and texture as cotton or linen rag, then 2½*d.* to 4*d* per lb. might be obtained. To serve as points of comparison we may here insert a notice of the ordinary and the lately increased prices of rags from the 'Journal of the Society of Arts.'

A.	26*s.*	......	32*s.* to 34*s.* per cwt.
B.	16*s.*	......	20*s.* ,,
C.	11*s.* 6*d.*	.....	15*s.* ,,
D.	7*s.*	......	10*s.* ,,

Bleaching salts, alkali, alum, hide pieces for size, are other articles required; and all have increased in price. Of the quantity of paper making material required, some idea may be formed from the fact that 177,633,009 lb. weight of paper were produced in 1853 in Great Britain. Paper is, in Europe, made chiefly from linen or cotton rags, but also from the refuse and sweepings of cotton-and flax-mills, as also of the coverings of our cotton bales and of worn-out ropes. Paper is also made from the stems and leaves of many grasses, as from rice straw, and from the bamboo by the Chinese, and of late from common straw in this country, and even from wood shavings. The fibrous part of many Lily and Aloe-leaved plants have been converted into excellent paper in India, where the fibres of Tiliaceous, Malvaceous, and Leguminous plants are employed for the same purpose: as in the Himalayas, one of the Lace-bark tribe is similarly employed, and in China one of the Mulberry tribe, and the Nettle in Holland. Plants belonging to the same families as the above abound in India and other warm countries, and are capable of yielding a very abundant and never-failing supply of sufficiently cheap and very excellent material for paper-making of all kinds. Some may be used without any further process of bleaching, but all are capable of having any colour they may possess destroyed by chemical means not excepting even the jute canvas or gunny bagging because specimens of jute of a beautiful silk, white, both plain and manufactured into fabrics for furniture, &c, &c., were shown by the late Colonel Calvert at the East India House. As the Chinese make paper of rice straw, and of the young shoots of the bamboo, while the Hindoos make ropes of different grasses (such as *Saccharum Munja* and *S. Sara*) strong enough for their Persian wheels as well as for towing lines, it is evident that these, and probably many others, contain a sufficiency of fibrous material for paper-making. The cultivated Cereals cannot well be turned to much account, for their straw forms the chief food for cattle; but as Southern Asia abounds with grass jungles, which are in the autumn of every year burnt down in order that the young blades may spring up and afford pasturage for cattle, it is evident that there are many situations where a sufficiency might be cut down before it has become perfectly dried up, and converted into half-stuff for paper-makers and the refuse of the Sugar-cane might be similarly employed. Of the Sedges in India, some are employed for making ropes, as the Bhabhur or *Eriophorum Cannabinum*, for making rope bridges for crossing some of the hill torrents, and the *Cyperus tegetum*, is used in India for mat-making. As these plants as well as Rushes grow together in large quantities, it would be quite possible in many places to turn them to profitable account. Many parts of the world abound in the Lily and Aloe-leaved plants which have been alluded to above, and of which the leaves contain much easily separable fibrous materials. These belonging to the genera Agave, Aloe, Yucca, Sanseviera, Bromelia, and others, all of which abound in white-coloured fibres, applicable to various useful purposes, and of which the tow might be used for paper-making, and considerable supplies obtained. Paper used to be made from the Sanseviera in Trichinopoly, some has been made at Madras, of the unbleached Agave alone, as also mixed with old gunny bags. And recently also, from the leaf of the Pandanus. The Arrow root and Ginger tribes, containing such plants as those yielding the fecula called Arrowroot, Tous les Mois, Tikkur, &c., and Ginger, Turmeric, Cardamoms, &c., all have annual stems and leaves, which are the refuse of the present culture, and might yield an abundant supply of half-stuff. Among cultivated plants there is probably no one so well calculated to yield a large supply of material fit for making paper of almost every quality as the Plantain (*Musa paradisiaca*) so extensively cultivated in all tropical countries on account of its fruit, and of which the fibre-yielding stems are applied to no useful purpose. The plant, as every one acquainted with tropical countries knows, is common near the poorest huts and in the largest gardens, and is considered to yield by far the largest quantity of nutritious matter. Its fruit in many places supplying the place of bread, and in composition and nutritious value approaching most nearly to the potato, may, if produced in too large a quantity, be preserved in the same way as figs, or the meal may be separated, as it resembles rice most nearly in composition. Each rootstock throws up from six to eight stems, each of which must be yearly cut down, and will yield from three to four pounds of the fibre fit for textile fabrics, for rope-making, or for the manufacture of paper. As the fruit already pays the expenses of the culture, this fibre could be afforded at a cheap rate, as from the nature of the plant, consisting almost only of water and fibre, the latter might easily be separated. One planter calculates that it could be afforded for £9 13*s*. 4*d*. per ton Some very useful and tough kinds of paper have been made in India from the fibres of the Plantain, and some of finer quality from the same material both in France and in England All the plants which have been already mentioned are devoid of true bark, and are called Endogenous in structure. Simple pressure between rollers, and washing, would appear to be sufficient for the separation of the fibres of most of them. But the following families of plants are all possessed of true bark which requires to be stripped off, usually after the stems have been steeped in water, before their respective fibres can be separated from the rest of the vegetable matter. The Flax plant abounds in fibre, but this is too valuable to be converted into paper. India, however, grows immense quantities of the plant, on account of its seed (linseed) which is both consumed in the country and exported in enormous quantities. But nowhere is the fibre turned to any account. This is no doubt owing to the climate not favouring the formation o soft and flexible fibre; but the short fibre which is formed, and might be easily separated, would be valuable for paper-making, and might add to the agriculturists' profits without much additiona outlay. So some Malvaceous plants are cultivated on account of their fruits being used as articles o diet, as Okhro (*Hibiscus esculentus*), in the Wes Indies and in the United States. The *Ram turai* o India is closely allied to it, and is cultivated fo the same purpose. Both plants abound in fin flexible fibre, which is not, but might be easil separated, and afford a considerable supply, especially if the cultivation was extended in th neighbourhood of towns. Paper is made fro a species of *Hibiscus* in Japan, and *H. Sabdariff* is cultivated in India on account of its jell yielding calices. Numerous other species Hibiscus, of Sida, and of other genera of th family, abound in warm climates; several a cultivated in different countries, as *Hibiscus cannabinus* in India, and *Sida tilioefolia* in Chin might be more so. They grow quickly, and a large size, and abound in fibrous material of fine, soft, flexible quality: on which accou they might be cultivated with profit. and t tow be useful to the paper-maker. The ste of Cotton plants would also yield a supp The Tiliaceæ are likewise remarkable for t abundance and fine quality of fibre which ma of them contain. *Tilia europea* produces t enormous quantities of bast exported from R sia. *Corchorus olitorius* and *C. capsularis*, t leaves of both of which are used as a vegetab yield the Jute of commerce, as well as the gun cloth and bags so largely used and exported e to America. Several species of Grewia yi an edible fruit; on which account they are cu vated. Others abound in the jungles of Sou ern Asia, and most would yield a valuable fibre, as some of them already do, for commercial purposes. The Indian Basts are cheap, and abound in fibre. Some of the Leguminosæ also abound in valuable fibre. *Crotalaria juncea* yields the common *Sunn* of India. *Sesbania aculeata* or *cannabina* yields the *Dhanchi* of Bengal; while *Bauhinia racemosa* is used for making rope bridges in the Himalayas. The fibre of *Parkinsonia aculeata* was sent to the London Exhibition of 1851, expressly as being fitted for paper making: though colourless, it wants strength. Some paper is made from gunny bags in India. Several plants produce large quantities of a silky cotton like substance, not applied to any use, such as the Silk Cotton tree, the Mudar of India, several speices of Saccharum, &c., which might be collected where labour is cheap, and would no doubt be well fitted for conversion into pulp for paper. The Dogbanes and Asclepiads, also deserve attention. The Nepal Paper plant *Daphne cannabina* has been mentioned above. Among the Nettle, the Mulberry, and Bread-fruit tribes of plants, there are many which seem well calculated to yield material for paper-making. The Chinese, we know, employ the inner bark of *Morus*, now *Broussonetia papyrifera*. This, no doubt, produces some of the Chinese papers, which is remarkable for toughness. The refuse cuttings of the bush cultivation of the Mulberry in Bengal might be turned to profitable account. The barks of many stinging (*Urtica*), and of stingless (*Boehmeria*) Nettles, abound in fibres remarkable for strength; the tow of these might be converted into paper-stuff, if not required for mixing with wool, as might also the bark cloths. The weeds of tropical countries, which grow in such luxuriance, and among which are species of Sida, of Grewia, of Corchorus, of Triumfetta and of many other genera, might all yield an abundance of fibrous material, if the refuse of the above cultivated plants were found not to be sufficient. Some simple machinery for separating the fibre would greatly facilitate operations, while the expenses of freight might be diminished by compression, or as suggested, by packing the material as dunnage. The cheapness of labour, as of everything else in many of these countries, would enable material for paper-making to be conveyed to England in great abundance and at a sufficiently cheap rate, if ordinary pains were taken by the consumers in Europe, to encourage the planter or colonists of a distant region. Dr. *Forbes Royle*. East India House, May , 1854.

Paper is a thin flexible leaf usually white, artificially prepared from some vegetable substance, chiefly for writing or printing upon with ink. A species of paper was manufactureed at a remote period in Egypt, from the *papyrus* or *paper-reed*, a plant growing freely on the banks of the Nile. A manufacture of paper from the bark of trees and other substances existed also in China, from a very early date; but among the nations of antiquity, before the introduction of paper, such substitutes were used as lead, brass, bricks, and stone, on which national edicts and records were written or engraved; or tablets of wood, wax, and ivory, skins of fishes, intestines of serpents, backs of tortoises, and the inner bark of trees for ordinary purposes. Indeed there are but few sorts of plants that have not been used for making paper and books, and hence have arisen the terms *biblos*, *codex*, *liber*, *folium*, *tabula*, *tillura*, *philura*, *scheda*, &c., which express the several parts of the plant which were written on. The use of these was discontinued in Europe after the invention of papyrus and parchment, but they are still used in other parts of the world. The two early kinds of manufacture above alluded to, must first be noticed, before we describe the later invention of making paper from cotton and linen rags, which in the greater part of the world has superseded all other methods of producing a material for writing on. The Egyptian papyrus was made by laying thin plates of bark, taken from the middle of the paper-rush, side by side, but close together, on a hard smooth table: other pieces of the same size and thinness were then laid across the first at right angles; the whole was moistened with the water of the Nile, which was supposed to have some agglutinating property, (though this probably resided in the plant itself,) and pressure was then applied for a certain number of hours. Thus a sheet of paper was formed which required no other finishing than rubbing and polishing with a smooth stone, or with a solid glass hemisphere, and drying in the sun. This very simple process was rather a preparation of a natural paper, than a manufacture—properly so called. The process adopted by the Chinese comes more legitimately under that head. The small branches of a tree resembling our mulberry-tree, are cut by them in lengths of about 3 feet, and boiled in an alkaline ley for the sake of loosening the inner rind or bark, which is then peeled off, and dried for use. When a sufficient quantity of bark has been thus laid up, it is again softened in water for 3 or 4 days, and the outer parts are scraped off as useless; the rest is boiled in clear ley, which is kept strongly agitated all the time, until the bark has become tender, and separates into distinct fibres. It is then placed in a pan or sieve, and washed in a running stream, being at the same time worked with the hands, until it becomes a delicate and soft pulp. For the finer sorts of paper the pulp receives a second washing in a linen bag; it is then spread out on a smooth table, and beaten with a wooden mallet, until it is extremely fine. Thus prepared, it is put into a tub with a slimy infusion of rice, and a root called oreni; then it is stirred until the ingredients are properly blended: it is next removed to a large vessel to admit of moulds being dipped into it. These moulds are made of bulrushes cut into narrow strips, and mounted in a frame; as the paper is moulded, the sheets are placed on a table covered with a double mat. The sheets are laid one on the other, with a small piece of reed between; and this, standing out a little way, serves afterwards to lift them up leaf by leaf. Every heap is covered with a board and weights to press out the water; on the following day, the sheets are lifted singly by means of the projecting reeds, and are placed on a plank to be dried in the sun. This paper is so delicate, that only one side can be written on, but the Chinese sometimes double the sheets, and glue them together so neatly, that they appear to be a single leaf. This manufacture of the Chinese extended also to the making of sheets of paper from old rags, silk, hemp, and cotton, as early as the second century of the Christian era, and is supposed to have been the source whence the Arabs obtained their knowledge of paper-making. The latter people first introduced the valuable art of making paper from cotton into Europe, in the earlier half of the twelfth century, and established a paper manufactory in Spain. In 1150, the paper of Xativa, an ancient city of Valencia, had become famous, and was exported to the East and West. Notwithstanding its fame, this paper was of a coarse and inferior quality, so long as its manufacture was confined solely to the Arabs, in consequence of their employing only mortars, and hand or horse mills for reducing the cotton to a pulp; but when some Christian labourers obtained the management of the mills of Valencia and Toledo, the different processes of the manufacture were greatly improved. Cotton paper became general at the close of the twelth and beginning of the thirteenth centuries, but in the fourteenth century, it was almost entirely superseded by paper made of hemp and linen rags. The paper made of cotton was found not to possess sufficient strength or solidity for many purposes; a very strong paper was therefore made of the above substances, not weakened by bleaching, according to the present mode, which, by removing the natural gum, impairs the strength of the vegetable fibre. Some of these old papers, having been well sized with gelatine, are said to possess their original qualities even to this day. The manufacture of paper from linen rags became general in France, Italy, and Spain in the fourteenth century; the first German paper-mill was established at Nuremberg in 1390. English manuscripts on linen paper, date as early as 1340; but it is believed that the manufacture did not exist here until the end of the fifteenth century, when the *Bartolomæus* of Wynkynde Worde appeared (1496), in which it is stated that paper of a superior kind was made for that work by John Tate, jun., at his mills in Stevenage, Hertfordshire. Probably the manufactory established by Tate was unsuccessful, for we hear no more of it, and in 1588 a German named Spielman, jeweller to Queen Elizabeth, established a paper-mill at Dartford. [This mill is celebrated by a poet of that age in a work entitled, "A Description and Discourse of Paper, and the benefits it brings; with the setting forth of a paper-mill, built near Dartford, by a High-German, called Mr. Spilman, jeweller to the Queen. Lond. 1588. 4to."] Still for a lengthened period England's supply of the finer kinds of paper was chiefly obtained from abroad. In 1770 the manufacture of fine paper was established at Maidstone, in Kent, by a celebrated maker, J. Whatman, who had worked as journeyman in some of the principal paper-mills on the Continent. Not long before this, *wove* moulds had been invented by Baskerville to obviate the usual roughness of *laid* paper, and these, attracting attention in France, led to the improvements which characterised the vellum paper of that period. Holland, too, contributed its share to the advancement of this manufacture, by inventing cylinders with steel blades for tearing the rags, and thus facilitating their conversion into pulp, which by the old method of stampers only, was a very slow and defective process. In 1799 the first attempt to produce paper in an endless web was made in France by a workman in the employ of M. Didot. The invention was brought to England by M. Didot in 1801, and made the subject of patents, which in 1804 were assigne to the Messrs. Fourdrinier. Mr. Bryan Donki the engineer, carried out the desired plans, an produced, after intense application, a self-actin machine or working model, on an improved plan of which he afterwards constructed many other for home use and for exportation, which were perfectly successful in the manufacture of continuou paper. In the year 1851 Messrs. Donkin & Co were constructing their 191st machine. I 1809 Mr. Dickinson, the celebrated paper-maker invented another method of making endless paper, the highly ingenious details of which will b noticed hereafter. The Fourdrinier machine have been greatly improved by the inventions o Mr. T. B. Crompton, Mr. Brown, of Esk Mill near Edinburgh, Mr. Ibotson, of Poyle, an other skilful manufacturers, English and foreign so that at the present time, England, which wa long dependent for its supplies on foreign countries, is not only able to produce an abundan supply for home use, but to export paper to considerable amount. At one time there wer serious apprehensions that the supply of line rags would fail, and various researches wer entered upon by ingenious individuals t find substitutes. A book written in Germa by M. Schaffers so long ago as 1772, [Sammtliche Papierversuche von Jacob Christia

Schaffers, Prediger zu Regenburg. *Regensburg*, 1772.] contains 60 specimens of paper made of different materials. This ingenious person made paper from the bark of the willow, beech, aspen, hawthorn, lime, and mulberry; from the down of the asclepias, the catkins of black poplar, and the tendrils of the vine; from the stalks of nettle, mugwort, dyer's weed, thistle, bryony, burdock, clematis, willow-herb, and lily; from cabbage-stalks, fir-cones, moss, potatoes, wood-shavings, and saw-dust. Paper has been likewise made from straw, rice, hop-bine, liquorice-root, the stalks of the mallow, and the husks of Indian-corn. The fear of a failure of linen rags, and the consequent necessity for these experiments, were obviated by the discovery of chlorine. This powerful bleaching agent will restore many varieties of coloured linen to its original whiteness, as well as discoloured papers and manuscripts, so that the same substances may be used over and over again as a material for paper.—*Tomlinson.*

(6039) PAPER, BURMESE, Paper Plant. The Burmese make a coarse paper from the bark of a large creeper, a species of Daphne, that is found in the forests. The paper is as thick as paste board, and the surface is blackened and written upon with a steatite pencil. Mr. Mason had never seen the plant in flower, but it is probably a species of Daphne.—*Mason.*

(6040) PAPER, CHINESE, of Bamboo, such as that on which the Hon'ble Mr. Morrison's book was printed, was manufactured from the common yellow bamboo paper of the Chinese by sizing it in water saturated with alum, to which glue is added; the sheets are dried and smoothed by rubbing them on a warm wall. The glazing which is upon writing paper is made by waxing the sheet, and afterwards rubbing it with a smooth stone; two, three, and four sheets are made into one thick sheet for ledgers, or other account books, by the same process, after wetting the inner surfaces with glue water, and drying the sheet in the sun. There is also a thin paper, called Nanking paper, which is manufactured from cotton wool, that is tougher and more flexible than the bamboo paper. Colored paper is exported in considerable quantities; the exportation of all kinds is principally to India and the archipelago. The consumption of Chinese writing paper is great in that part of the world, on account of its not being injured by the climate; foreign paper sized with glue being liable to spoil.—*Morrison.* Mr. Fortune tells us that in the canals near the city there were large quantities of bamboos partially covered with mud so as to be pressed under water. These were intended to be made into paper after they had been soaked for some time. The whole of the process of making paper from the bamboo did not come under his notice while travelling in the country, but it is carried out somewhat in the following manner:—After being soaked for some time in the way noticed, the bamboos are split up and saturated with lime and water, until they become quite soft. They are then beaten up into a pulp in mortars, or where water-power is at hand, as in the hilly districts, the beating or stamping process is done by means of stampers, which rise and fall as the cogs which are placed on the axis of the water wheel revolve. When the mass has been reduced to a fine pulpy substance it is then taken to a furnace and well boiled until it has become perfectly fine, and of the paper consistency. It is then formed into sheets of paper. Bamboo-paper is made of various degrees of fineness, according to the purposes for which it is intended. It is not only used for writing upon and for packing with, but a large quantity of a coarse description is made for the sole purpose of mixing with the morter used by bricklayers. It was in the fields about Cading he found two fine species of carabus, under stones, which were highly prized by entomologists at home. On the first discovery of these insects he showed them to a group of children who were with him, and offered to buy all they brought, at the rate of thirty cash for each perfect specimen.—*A Res. among the Chi. p.* 333.

(6041) PAPER, COUNTRY.

Naat Cardasie, Tam. | Nulla kakidum, Tel.
Kagus, Duk.

The coarse kind of paper prepared by the natives in Madras, was in Ainslie's time commonly made of old gunny bags or old fishing nets. In the process lime water and rice cunjee were employed and frequently a little Indigo to give it a blue tinge. Supposing from the whiteness and great tenacity of the Marool (or Munchie) nar that a valua[illegible] kind of paper might be prepared with it, he recommended a trial of it to the paper makers at Trichinopoly, in July 1813. They hesitated, never having heard that paper can be made from this substance, but were induced to make the experiment, and succeeded in making a much better and whiter paper than what is commonly made with old gunny bags. He could not learn that Paper is ever made in India as it is in the Ava dominions, either from the bark of the paper Mulberry (Morus papyrifera,) or from the macerated filaments of the Bamboo.—*Ains. Mat. Med. p.*190.

(6042) PAPER HANGINGS. Paper stained or printed with tasteful designs, and used for pasting on the walls of a room &c. There are many varieties, which are manufactured in England, France, Germany,

(6043) PAPER, HIMMALAYAN. The art of making paper is considered to be a Chinese invention, but it has long been known in India, where paper is made both of cotton and of the substitutes for hemp and flax. In the Himalayas it is made of the inner bark of *Daphne Cannabina*, and in sheets of immense size. A large collection was exhibited from different parts of India, but, though well adapted for writing on, in India, it is not suited for Europe, in consequence of the difference in the ink used.—*Royle, Arts &c. of India, p.* 486.

(6044) PAPER, MULBERRY, Broussonetia Papyrifera, is a native of the isles of the Southern ocean, as well as of China and of Japan. It has long been famous for its fibrous bark, which is made into a kind of cloth, as in Otaheiti and in the Sandwich islands, as well as into paper, in Japan. In making this paper the bark is boiled into pulp in a ley of wood ashes, and then well washed by agitation of it in water, until it becomes like tufts of tow. If too much boiled, the paper will be weak but white; and if insufficiently washed it is coarse but strong. It is then heaped on a table and beaten into a pulp, by batons of hard wood. Mucilage obtained from boiled rice, or from a plant called oreni, is added to the pulp, which is stirred with a clean reed until reduced to a homogenous liquor, and when of a due consistence it is ready for conversion into sheets of paper.

(6045) PAPER-NAUTILUS. [Octopoda].

(6046) PAPER PLANT OF NEPAUL is Daphne Bholua or Cannabina, one of the same family as the Lace Bark Tree, Daphne Legetta, now called Lagetta lintearia, of the West Indies. It is supposed to be identical with the D. Odora of Thunberg. It is extremely abundant in the Himalayas, and the paper is made by boiling the inner bark, in a ley of wood ashes, and reducing them to pulp by beating. Daphne or Gnidia eriocephala is very common on the Western Ghauts, and on the hilly parts of the Southern Mahratta country and Dekhan. On a trial of the paper by an engraver, he reported it as affording finer impressions than any English made paper, and nearly as good as the fine Chinese paper which is employed for what are called India paper proofs. Dr. Campbell describes the paper as strong and durable as leather.

(6047) PAPER, RICE. As this, says Fortune, was my first visit to this fine island and as I knew we had only a short time to stay, I lost no time in going on shore. Before leaving the vessel, I had been examining with a spy-glass some large white flowers which grew on the banks and on the hill-sides, and I now went in that direction in order to ascertain what they were; when I reached the spot where they were growing, they proved to be very fine specimens of Lilium japonicum—the largest and most vigorous I had ever seen. As I was admiring these beautiful lilies which were growing as wild as the primroses in woods in England, another plant of far more interest caught my eye. This was nothing less than the rice-paper plant—the species which produced the far-famed rice paper of China named by Sir W. Hooker Aralia papyrifera. It was growing apparently wild, but the site may have been an old plantation, which was now over-grown with weeds and brush-wood. The largest specimens which came under my notice were about five or six feet in height, and from six to eight inches in circumference at the base, but nearly of an equal thickness all up their stem. The stems, which usually bear all the way up, were crowned at the top with a number of noble looking palmate leaves on long footstalks, which gave to the plant a very ornamental appearance. The under side of each leaf, its footstalk, and the top part of the stem, which was clasped by these stalks, was densely covered with down of a rich brown colour, which readily came off upon any substance with which it came in contact. I did not meet with any plant in flower during my rambles, but it is probable the plant flowers at a later period of the year. It flowers, and seeds during the winter and spring months at Hong-kong and Calcutta. Numerous small plants are coming through the ground in various directions, which a Chinese soldier carefully dug up for me, and which I took with me to Shanghae and deposited in Mr. Bealis' garden. These, with a few samples of the largest stems I could find, have been sent to England and India; the latter will prove an interesting addition to our museums of vegetable productions. The proportion of pith in these stems is very great, particularly near the top of vigorous growing ones, and it is from this pure white substance that the beautiful article erroneously called "rice-paper" is prepared. The Chinese call this plant the Tung-tsaou. What it was, or to what part of the vegetable kingdom it belonged was long a mystery to botanists, who were often times sadly misled by imaginary Chinese drawings, as some of those which have been published will clearly show, now that our knowledge has increased. Indeed the only drawing I have seen in Europe, which has any claim to be considered authentic, is that brought from China by the late Mr. Reeves many years ago, and which I have seen in the library of the Horticultural Society of London. The Tung-tsaou is largely cultivated in many parts of the island of Formosa, and with rice and camphor forms one of the chief articles of export. Mr. Bowring, who read a paper upon the rice-paper plant, before the China branch of the Royal Asiatic Society, informs us that the Canton and Fokeen provinces are the chief consumers, and that the town of Foo-chow alone is supposed to take annually not less than 30,000 dollars' worth of this curious and beautiful production. The cheapness of this paper in the Chinese market, as Mr. Bowring justly remarks, is evidence of the abundance of the plant in its place of growth, and more especially of the cheapness of labour. "That 100 sheets of this material (each about three inches square), certainly one of the most beautiful and delicate substances with which we are acquainted, should be procurable for the small sum of 1¼d. or 1½d., is truly astonishing: and when once the attention of foreigners is directed to it, it will doubtless be in considerable request among workers in artificial flowers in Europe and America, being admirably adapted to their wants." The larger sheets, such as those used by the Canton flower-painters, are sold for about 1½d. each. If the Tung-tsaou proves hardy, in England, its fine foliage will render it a favourite amongst ornamental plants in English gardens. Judging, however, from its appearance when growing on its native island, and from the temperature of Formosa, I fear we cannot expect it to be more than a greenhouse plant with us. Before I left China, it has been completely naturalised on the island of Hong-kong. A noble plant was growing in the garden head quarters house: several very fine ones were observed in Messrs Jardine's garden at East point, to which Mr. Bowring had introduced it, and younger plants were seen springing up in all directions. It is really a most striking looking plant and highly ornamental. At all times the fine, broad palmate leaves which crown the stem have a noble appearance, and in the winter months its large panicles of flowers make it more interesting.—*A Res. among the Chi. p.* 231. The paintings on Chinese pith paper, or *rice paper*, as it is commonly but incorrectly called, are much sought after for their splendid colorings. This substance, whose velvety surface contrasts so admirably with brilliant colors, is a delicate vegetable film, consisting of long hexagonal cells whose length is parallel to the surface of the film, and which are filled with air when the film is in its usual state; the peculiar softness which so well adapts it for receiving colors is owing to this structure. Mr. Williams says it is obtained from a plant allied to the Artocarpus or bread-fruit, growing in the western provinces, but no very accurate information is possessed of its habits or appearance; some say it is a water plant. The pith is carefully taken out and cut in sheets by running a knife around it, and smoothing them with an iron. When the tissue breaks, the fracture is connected by a lamina of mica. An india-ink outline is first transferred by damping and pressing it upon the paper, when the ink strikes off sufficiently to enable the workman to fill up the sketch; one outline will serve for limning several copies, and in large establishments the separate colors are laid on by different workmen. The manufacture of these paintings at Canton employs between two and three thousand hands. Another tissue sometimes used by the Chinese for painting, more remarkable for its singularity than elegance, is the reticulated nerve-work of grape leaves, the fleshy green part of the leaf having been removed by maceration, and the membrane filled with isinglass. The appearance of a painting on this transparent substance is pretty, but the colors do not retain their brilliancy.—*Williams' Middle Kingdom, Vol.* II. *p.* 145. *Eng. Cyc.*

(6048) PAPER OF THIBET. Most of the paper used in Thibet is made from the bark of various species of *Daphneæ*, and especially of *Edgeworthia Gardneri*, and is imported from Nepal and Bhotan; but the Tibetans, as MM. Huc and Gabet correctly state, manufacture a paper from the root of a small shrub: this I have seen, and it is of a much thicker texture and more durable than Daphne paper. Dr. Thomson informs me that a species of Astragalus is used in western Tibet for this purpose, the whole shrub, which is dwarf, being reduced to pulp.—*Hooker, Him. Jour. Vol.* II. *p.* 162.

(6049) PAPIER MACHE. A name properly applied to articles composed of paper-pulp, boiled in a solution of gum or size to give it tenacity, and then pressed into moulds; though the term is also applied to trays, snuff-boxes, and other things made by glueing several piles of paper together, and then varnishing. Birmingham is the chief seat of this manufacture.—*Faulkner.*

(6050) PAPILIO, a genus of Lepidopterous Insects, established by Linnæus, and divided by subsequent entomologists into many groups and genera. It includes that very natural and beautiful assemblage of insects popularly known as Butterflies. The first section of *Lepidoptera*, named *Rhopalocera* (club-horned) in the arrangement of Boisduval, and *Diurna* in that of Latreille, corresponds with the Linnæan genus *Papilio*. The insects composing it have mostly thin and elongated antennæ terminated by a club. They are all day-fliers. Their larvæ, which are variously shaped, have six pectoral, eight abdominal, and two anal feet. The pupæ are usually angulated and, with a few exceptions, naked. The perfect insect varies in size from less than an inch across the wings when expanded, to nearly a foot in breadth. Equally variable are their colouring and outlines. They are short-lived. Their powers of flight are very great, and the mode of flight varies in the several species. The males are usually more gaily coloured than the females.—*Eng. Cyc.*

(6051) PAPILIO MACHAON. Choongtam in Sikhim boasts a profusion of beautiful insects, amongst which the British swallow-tail butterfly (*Papilio Machaon*) disports itself in company with magnificent black, gold, and scarlet-winged butterflies, of the Trojan group, so typical of the Indian tropics.—*Hooker Him. Jour. Vol.* II. *page* 26.

(6502) PAPYRUS, a genus of Plants belonging to the natural order *Cyperaceæ*. This generic term has been derived from the name of a water plant, whose soft cellular flower-stem afforded the most ancient material from which paper was prepared, and our English word paper is derived from it. It has a stem from 3 to 6 feet high, with 3 acute angles, one of which, according to Bruce, is always opposed to the current of the stream in which it grows, as if to break its force. Its leaves are long and grassy, with a sharp keel. The flowers, which are green, are produced in very large compound umbels, with extremely numerous drooping triangular slender radii, terminated by very long filiform involucral leaves, within which are placed the spikes of flowers, each consisting of from 6 to 13 florets. It has been regarded as a species of *Cyperus*, and called *C. Papyrus*. It is also considered a distinct genus, and is named *Papyrus antiquorum*. It is a very common plant in Abyssinia, Egypt, and Syria, and is also met with in Calabria and Sicily; in gardens it is not uncommon. It inhabits both stagnant waters and running streams, and, independently of its ancient employment in the fabrication of paper, has been applied to other uses. The flowering stems and leaves are twisted into ropes; the roots are sweet, and have been employed as food. In Abyssinia boats are constructed from it, according to Bruce. In Syria the plant is called Babeer.—*Eng. Cyc.* A curious correspondence has taken place between M. Egger, a member of the Institute of France, and M. Firmin Didot, the printer and publisher, on Ancient substitutes for Paper. M. Rhizo Rhangabe, now Minister of Foreign Affairs in Greece, published, some time since, a copy of the remaining portions of an inscription detailing the expences incurred by the Athenians in the construction of the Erectheion, in the year before Christ 407. M. Egger drew the attention of M. Didot, by letter, to two of the items published by M. Rhangabe, in which, the cost of two tablets for writing the accounts on is given at one drachma (nearly 9d.) each, and the price of two leaves of paper for copies at one drachma and two oboli (or nearly 1s.) each. M. Egger states, that these accounts were drawn up on wooden tablets coated with white wax, like those used for the annals of the Roman Pontiffs, and called albums, from their colour. The paper is conceived to have been formed of leaves of the papyrus, and not of the skins of animals, used in Asia for the purpose (as stated by Herodotus), nor of parchment, Charta Pergamena, so called from Pergamnus in Mysia. M. Egger assumes that wax tablets were used in place of paper on account of their costing less money, though at the present time they would, of course, be by far the dearer material of the two. A family consisting of four adults, could, it is stated, live in Athens on a sum equivalent to £ 20 a year,—and, starting from this data, M. Egger infers that the cost of the wax tablets must, according to the present value of money, have been about 3d. and that of a leaf of papyrus nearly 4s.:—and he writes to M. Didot to inquire whether the papyrus which fetched so exorbitant a price relatively had any qualities to compensate for its dearness. In reply, M. Didot says that the price paid at the period alluded to for a leaf of papyrus corresponds exactly with that of a sheet of vellum at the present day. He agrees with M. Egger, that the paper referred to was the papyrus leaf then an important article of commerce with the Egyptians. The Greeks called it biblos, and the paper made from it chartas, whence the Latin charta, the prepared skins used by the Persians were called dipteri or derris. When the Ptolemies, out of mere literary jealousy, stopped the export of papyrus, in order to deprive Eumenes and Attalus (the king of Pergamus) of the materials for forming books, the latter, whose collection of books already vied with the Library of Alexandria, caused great attention to be paid to the manufacture of skins,—these were called Pergaminon and bembrani, whence membrana. The high price of papyrus had, of course, a great effect upon the cost of books. Plato is said to have paid 100 minæ (equal to about £360.) for the three treatises written by Philolans, the Pythagorean philosopher,—and Aristotle paid three talents (equal to nearly £650.) for a few volumes which had belonged to Spensippus, a disciple of Plato. As the papyrus was of a spongy texture, and the ink ran into it and made the writing difficult to read, the ancients had a plan of sticking two leaves together cross wise as regards the fibres. This however, only produced a partial cure, and experiments were made in applying a coating of size to fill up the pores. A man named Philtoteeis at length invented a paste of starch and vinegar, which was looked upon as so important a discovery that the Athenians erected a statue in his honour. It is stated as a remarkable fact that, although the papyrus plant was used so extensively by the Egyptians, who constructed boats and covered houses with the stems, made sails from the bark, fuel of the roots, and clothing and ropes from the fibres, not a single specimen of the plant is now to be found in that country. M. de Sauley states, however, that it may be found in great abundance on the banks of a rivulet in Judæa, between Jaffa and Kaisarieh. When the Arabs began to make paper from the cotton, called charta Damascena, from the original place of manufacture, papyrus began to decline in value,—still the competition between the two articles was maintained with vigour until the application of waste flax and hemp to the making of paper was discovered, in the twelfth century. The last named materials were, however, themselves doomed to be superseded by the application of rags to the manufacture of paper. London *Athenæum*, dated 2nd May 1857.

(6053) PAPYRUS PANGOREI, Syn CYPE- US TEGETUM.

Madoorkati, HIND.

The Papyrus Pangorei is a sedge, extremely ommon about Calcutta and is very extensively nployed in Bengal for making the elegant hining useful mats for which the Capital of ndia is famous, and which are frequently im- orted into Europe. Strips of this sedge are ited for platting.—*Eng. Cyc.*

(6054) PARAS NATH, a mountain in Be- ar of great sanctity : it is the eastern, as Mount boo is the Western Metropolis of Jain worship. -*Hooker. Him. Jour. Vol.* 1, *p.* 18.

(6055) PARATROPIA. PARATROPIA DIGI- ATA. PARATROPIA VENULOSA. The Karens ake an infusion of the leaves of a species of aratropia, a plant of the ivy family, which they se for many internal diseases.—*Mason.*

(6056) PARCHMENT. Consists of the skins f sheep and goats, prepared in such a manner, s to render them suitable for being written pon. It is chiefly employed for charters and ther writings where great durability is desirable. -*Faulkner.* Parchment, the skin of an animal repared for writing on. The name is from the atin *Pergamena*, from *Pergamus*, the reputed lace of its invention. Eumenes II. king of iat place (who reigned B. C. 197—159), has ie honour of the invention, he being stimulat- l thereto by the prohibition of the export of pa- yrus from Egypt. Some authorities consider umenes to have been only an improver of the t of preparing skins for writing on, which He- odotus says were commonly used for that purpose i his time ; and it is even asserted that the word *rgamena* was not used until several centuries ter the death of Eumenes. ' According to Ma- llon, the first writer who uses the term is Tat- , a monk of the fourth century ; before his time, ie word *membrana* was employed, as in the reek Testament, 2 Tim. iv. 13.—*Tomlinson.*

(6057) PARCUTILLE, the Tamil name of Ceylon tree, which grows to about twenty-four ches in diameter, and fifteen feet in height. It is sed by the natives in boats, houses, and other orks : it is not of great value.—*Edge, Ceylon.*

(6058) PARDANTHUS CHINENSIS. TIGER LY. A showy yellow and orange flower, whose tals are spotted like a leopard's skin, and be- nging to the iris tribe, is very commonly culti- ted by the Burmese as well as by Europeans. -*Mason.*

(6059) PAREIRA BRAVA, VELVET LEAF.

Grieswurzel. GER.

A medicinal root, procured from the *Cissam- los Pareira*, a native of the West Indies and outh America.—*Faulkner.* Dr. O'Shaughnessy riting on the *Pareira brava*, or wild vine, says Dr. Roxburgh, Fl. Indica, vol. iii. p. 848, describes six species of cissampelos, viz.

(6060) *C. Glabra*, (*vern.* Peer grug,) a native of Sylhet, root acrid and used in medicine by the natives.

(6061) *C. hexandra*, (*vern.* Neemooka,) a native of Bengal.

(6062) *C. convolvulacea*, a native of Coromandel and Malabar.

(6063) *C. Caapeba*, from the Moluccas.

(6064) *C. hernandifolia*, a native of Chittagong.

(6065) *C. tetrandra*, brought from Amboyna. The C. glabra, hexandra, hernandifolia, and convolvulaca, natives of the Peninsula, are all referred by Wight and Arnot to the same species, which differs from C. Pareira chiefly in the form of the sepals, and the length of the staminal columns. We have used the Neemooka of Bengal with decided advantage under the same circumstances as the *Pareira brava* would be employed in. With this and the Menispermum cordifolium we are but little dependent on other countries for the valuable remedy so justly lauded by Brodie and others. —*O'Shaughnessy, page* 200.

(6066) PARIDÆ. A natural family of Perching Birds (Insessores.)—*Eng. Cyc.*

(6067) *Parus xanthogenys*, has the head with a full crest of black feathers; occiput, supercilliary stripe, and cheeks, yellow ; ear-coverts black ; back olive ; wings and tail black, the former spotted, and the latter tipped with white ; a broad black line passing down the throat, and extending along the middle of the abdomen ; sides of the chest and flanks pale-yellow ; bill and feet black ; size rather less than that of the Greater Tit, *P. Major.* (Gould). This bird is a native of the Himalaya Mountains. —*Eng. Cyc.*

(6068) PARINARIUM EXCELSUM. POMACEA. A large tree brought to Bombay from Goa : the fruit, which ripens in December and January, resembles a coarse plum, and is held in much estimation.—*Riddell.*

(6069) PARIS, a genus of Plants belonging to the natural order *Asparageæ.* It has a patent horizontal perianth, 8-parted to the base, the four inner parts, or corolla, narrower than the others. There are 8 stamens, the anthers fixed to the middle of a subulate filament. The styles are 4 in number, the berry 4 celled, the cells with from 4 to 8 seeds.—*Eng. Cyc.*

(6070) PARIS QUADRIFOLIA, Herb-Paris, the only British species, has usually four leaves in a whorl, a stem about a foot high springing from the extremity of a long rhizoma, usually with four, occasionally from three to six leaves at its summit. The flowers are solitary and terminal, the sepals lanceolate, the petals subulate. It has no root-leaves, and is found in damp woods in England. It is considered to be a narcotico-acrid poison.—*Eng. Cyc.*

(6071) PARITIUM MACROPHYLLUM AND P. TILIACEUM, the bet-mwæ -shaw of the Burmese, furnishes that nation with a material for ropes. Another species, the P. tiliaceum is the Burm, Gyee-nya-shaw.—*Mason.* Captain Benson exhibited fibres of Paritium macrophyllum, Nos. 8720 and Urena lobata (both malvaceous plants) from Moulmein. These samples possess much merit and the former especially so, being long, soft, pliant and strong, color brown.—*M. E. Juries Reports.*

(6072) PARITIUM TILIACEUM. HIBISCUS. TILIACEUS. Tortuous hibiscus. The banks of our tide-water streams are often damasked with the changeable red and yellow flowers of this large luxuriant bush, whose crooked wandering branches, crossed and locked with each other, spread along the ground heaping the earth with its evergreen foliage.—*Mason.*

(6073) PARKIA, a genus of Plants belonging to the natural order *Leguminosæ* and the tribe *Mimoseæ*. It was named by Mr. Brown in honour of the great African traveller Mungo Park. The genus contains only a few unarmed trees, which are found on the west coast of Africa, the peninsula of India, Silhet, and in the Islands to the eastward of the Bay of Bengal. *Parkia* is distinguished among the Mimosa-like *Leguminosæ* by the tubular 5-cleft calyx and the corolla with 5-distinct petals having a more or less imbricate æstivation ; stamens 10, hypogynous, monadelphous. Legume many-seeded, 2-valved, with a farinaceous pulp around and between the seeds. Inflorescence an axillary peduncled and club-shaped spike.—*Eng Cyc.*

(6074) PARKIA AFRICANA is the Nitta, or Doura-Tree of Soudan. The farinaceous matter surrounding the seeds is eaten, and also made into a pleasant drink when steeped in water. The seeds are roasted as coffee is with us, then bruised and allowed to ferment in water. When they begin to become putrid, they are well washed and pounded, and the powder is made into cakes resembling chocolate, which form an excellent sauce for all kinds of meat. (Brown, in Denham.) A species of this genus, the *Mimosa pedunculata* of Roxburgh, is said by him to be similarly valued by the Malays, that is, they eat, the mealy matter which surrounds the seeds, as well as the seeds themselves, which are said to taste like garlic.—*Eng Cyc.*

(6075) PARKIA BIGLANDULOSA. MIMOSEÆ.

Chendoo Phool, HIND.

A very elegant tree ; the flower-buds resemble balls of red velvet, legumes filled with a farinaceous edible pulp.—*Riddell.* A very elegant tree of large size, introduced from Africa, the legumes are filled with a farinaceous pulp, the wood is hard and promising, surrounded by an astringent bark. A watery extract has been prepared, but the value of which for tanning purposes has yet to be tested. A supply of timber is not yet procurable. Hort. garden 24.—*M. E. J. R.* The sweet and farinaceous pulp within the pods is highly esteemed and made into sweetmeats The natives also make a pleasant drink by diffusing the farina through water. This tree has now been introduced, for many years, into some of the Gardens about Madras ; the farina is a new article of food in this Presidency an deserves attention.—*M. E J. R.*

(6076) PARKIA SUBGLOBOSA, sweet farina is prepared from the pods, and used in making sweetmeats.—*Eng. Cyc.*

(6077) PARKINSONIA, a genus of Plants belonging to the natural order *Leguminosæ.*—*Eng. Cyc.*

(6078) PARKINSONIA ACULEATA, the Barbadoes Flower-Fence, is a well known West Indian shrub, very generally employed in such climates as an ornamental plant, and especially for the construction of hedges, fo which its strong spines render it well adapted It has long pinnated leaves, with a winged petiole, and grows as much as 12 or 15 feet high The flowers are large, yellow, very numerous, an a little variegated with red spots, and are succeeded by long narrow knotted pods. When i flower it is said to be one of the most splendi objects in the vegetable kingdom.—*Eng. Cy* This small graceful tree, with pretty yello flowers in loose pendulous racemes, grow readily from seed, and is well adapted for hedg rows, the stem from which the leaves spring capable of being converted into a white fibr and might be used for paper making.—*Riddel* Though this is an American plant, it ma like the Agave, be enumerated among Indi products, because it may now be met wi as one of the most common trees in villag and cantonments, flourishing with less ca than any other. Some of its fibre, of beautiful white colour, was sent to the Exhib tion of 1851, as a material for paper-makin and which could probably be afforded at a che rate, from the cuttings of the shoots of t plant. It, however, has been considered in t country as wanting in strength. It migh nevertheless, be found useful in mixing with oth fibrous substances, and beaten up into ha stuff.—*Royle, Fib. Pl. p.* 298.

(6079) PARSLEY. Apium Petroselinum. well known seasoning herb, used in soups, ga nishing, &c., grows well during the cold mont requires a free rich soil, and planted on a b raised 6 inches above the surface level, rais from seed.—*Jaffrey.* Is cultivated from see may be sown in beds or rows, where it is to main. The plants, when about two or three ches high, should be thinned, and a space of at least a foot left between each. It will, if watered and taken care of, continue all the year round. A good plan is occasionally to cut down the leaves to within four inches of the root, as it makes the parsley throw out young and fresh leaves. It bears transplanting well. Always give the preference to Europe seed. The common parsley of the country is very insipid. The roots of parsley are much used in French cookery.—*Jaffrey.*

(6080) PARSNIP. This vegetable is very difficult to rear, as it does not often happen that the seeds come up; they should be sown broadcast in beds of a rich soil, and the plants, when of a sufficient size, carefully thinned, leaving a space of one foot between each plant and removng all weeds. They may be transplanted, but t must be done with the same care as recommended for beet-root. The proper time for sowng the seed is the latter end of July, and they will come in during March and April. It goes o seed freely, but the roots grown from it were by no means fine the second year.—*Jaffrey.*

(6081) PARTHENOPIDÆ, or *Parthenopians* of Milne-Edwards. This tribe, in the arrangement of M. Milne-Edwards, corresponds nearly to the genus *Parthenope* as established by Fabricius, but the species are separated by Milne-Edwards into the genera *Eumedonus*, *Eurynome*, *Lambrus*, *Parthenope*, and *Cryptopodia*, forming a natural group which, in the opinion of the last-named zoologist, establishes he passage between the Maians [MAIIDÆ] and he Cyclometopes. The tribe is widely distributed, and species are found in the English Channel, the Mediterranean Sea, and the Indian Ocean.

Lambrus echinatus. It is found on the coasts of Pondicherry.

L. longimanus, is found at Pondicherry, Amboyna, &c.

L. serratus. It inhabits the Indian Ocean. —*Eng. Cyc.*

(6082) *Parthenope Horrida*, is a native of the ndian and Atlantic Oceans.

Cryptopodia fornicata. (Edwards.) Inhabits he Indian Ocean.—*Eng. Cyc.*

(6083) PASPALUM (from one of the Greek names for Millet), a genus of Grasses, which, ike some species of *Panicum*, forms one of the mall grains cultivated in tropical countries as ood for the poorer classes of the community. The genus is characterised in habit by having a continuous spiked rachis, on one side of which he spikelets are attached. The glume is 2 valved, 1-flowered, closely pressed to the two plane converse paleæ. Seed adhering to the paleæ.—*Eng. Cyc.* One or more species of paspalum are products of Tenasserim fields.—*Mason.*

(6084) PASPALUM FRUMENTACEUM. Linn.

Warroogoo. TAM.
Kodorow, DUK.
Arikehloo, TEL.
Harakah, CAN.
Kodow, HIND.
Khodra, GUZ.
Kodravaha, SANS.

This small, valuable grain tastes something like rice, and is prepared in the same way by the Indians. There is a variety of it, called in Tamul Serrookoo Warroogdo and in Teloogoo, Tikkà Arikchloo, which, if not dressed in a particular manner, is said to produce vertigo, nausea and other unpleasant symptoms. Dr. D. White of Bombay, writes that this variety is called in Guzerattie, Menya, which he naturally supposes is taken from the Sanscrit word Mana, signifying causing Phrensy.—*Ainslie, p.* 220.

(6085) PASPALUM PILOSUM, Roxb.

Pani Warroogoo, TAM.

This is a grain cultivated in Coimbatore, where it is eaten by the poor.—*Ainslie, p.* 220.

(6086) PASPALUM SCROBICULATUM, the Koda of the natives of India, is cultivated over almost all parts of India. It delights in a light, dry, loose soil, but will grow in a very barren one. The seed is an article of diet with the Hindoos, particularly with those who inhabit the mountainous parts of the peninsula, as well as in the most northern parts of the country, or where the soil is barren and unsuited to the cultivation of those grains which are more beneficial. Dr. Roxburgh states that the boiled grain is as palatable as rice. He distinguishes from this another species, which Linnæus called *Paspalum Kora*, but it appears to be only a variety growing in moist situations. Both species are much relished by cattle either in a green or dry state.—*Eng. Cyc.*

(6087) PASSIFLORA, a genus of twining Plants, the species of which are called Passion Flowers. This name is derived from a fancied resemblance between the parts of their flower and the emblems of Our Saviour's crucifixion. In the five anthers the Spanish monks saw his wounds, in the triple style the three nails by which he was fixed to the cross, and in the column on which the ovary is elevated the pillar to which he was bound; a number of fleshy threads which spread from a cup within the flower were finally likened to the crown of thorns. "There are cuts," says Sir James Smith, "to be found in some old books, apparently drawn from description, like the hog in armour upon our signs to represent the rhinoceros, in which the flower is made up of the very things themselves." The genus comprehends a large number of species, chiefly found in a wild state in America, and within or near the tropical parts of that continent. They are all twining plants, often scrambling over trees to a considerable length, and in many cases are most beautiful objects on account of their large gaily- or richly-coloured flowers. This makes them favourites in gardens, where many are cultivated, particularly the *P. alata*, *P. quadrangularis*, *P. edulis*, *P. cærulea*, *P. racemosa*, *B. Londoni*, *P. onychina*, *P. palmata*, and *P. filamentosa*, all of which are strikingly handsome. It is however chiefly for their fruit that they are valued in the countries where they grow wild, in consequence of the pulp which envelopes the seeds being cool and refreshing, with something of a fragrant bonquet. Under the name of Granadilla, the *P. quadrangularis* is well known in Brazil, where its fruit is as large as a child's head; the Water-Lemon of the West Indies is the produce of *P. laurifolia*; *P. maliformis* bears what is called the Sweet Calabash; and the pleasant pulp of *P. edulis* furnishes the confectioner with the most delicate material for the flavouring of ices. Many however are of no value for their fruit, and some are actually fœtid.—*Eng. Cyc* The greater number do well on the plains, they require abundance of water. Not at all adapted for pot culture, easily propagated by cuttings during the rains under glass; some of the common varieties can be propagated in the open air during that season, require a well manured soil. Natives of the tropics, many of which have been hybridized.—*Jaffrey.*

(6088) PASSIFLORA. PASSIFLORACEÆ.—Passion Flower. Passiflora Alata.—These ornamental climbers, are common in most parts of India, the species are numerous, being of easy culture. Some of them are fruit bearing, as the P. edulis and P. laurifolia, the latter is known from its dark shining leaves. There are several wild varieties.—*Riddell.*

(6089) PASSIFLORA FŒTIDA. A species of passion flower with fœtid flowers, but very elegant moss-like involucres, though rarely noticed in gardens, may be often seen creeping over the hedges in Maulmain like an indigenous plant.—*Mason.*

(6090) PASSIFLORA LAURIFOLIA. LAUREL-LEAVED PASSION FLOWER. Numerous species of passion flower are seen wandering over the arbors and trellises of our sunny greens, but none exceed in beauty, and fragrance the laurel-leaved passion flower, called in the West Indies, water lemon vine, which appears to have been the first of the tribe introduced into Burmah.—*Mason.*

(6091) PASSIFLORA LESCHENAULTII.

(6092) PASSIFLORA QUADRANGULARIS. GRANADILLA. This luxuriant exotic from the Jamaica passion flowers, flourishes well on the Tenasserim Coast, and is very prolific. The smooth oblong fruit grows nearly as large as a cucumber, and contains a succulent pulp, which makes a cooling delicious dish, and when prepared in tarts, can scarcely be distinguished from green apple. The Rev. Mr. Bennett of Tavoy, has recently introduced it among the Karens, by whom it is highly esteemed, and much sought for. It will no doubt soon be generally diffused through the Provinces, as it possesses all the attractive qualities of fine fruit, handsome fragrant blossoms, and when trailed over an arbor, a rich passing shade.—*Mason.*

(6093) PASTINACA (from *Pastinum*, the Latin name for a two-pronged fork), a genus of Plants belonging to the natural order *Umbelliferæ* and the tribe *Peucedaneæ.—Eng. Cyc.* Wight gives pastinaca hookeriana, 1010; rigens, 1009; Sprengeliana, 1008;

(6094) PASTINACA SATIVA, the Parsnip, has an angular furrowed stem; pinnate leaves, downy beneath: ovate-oblong leaflets, crenate, serrate, often with a lateral lobe at the base. It is extensively cultivated in Guernsey and Jersey as fodder for cattle. In the north of Ireland parsnips are used in the composition of a kind of beer brewed with hops. Wine and ardent spirits are likewise made from the roots.—*Eng. Cyc.*

(6095) PASTINACA SEKAKUL is another edible species of this genus, and is a native of Syria and Egypt. It has a gray root; a terete downy branched stem; pinnate downy leaves; pinnatifid cut leaflets, blunt and unequally toothed.—*Eng. Cyc.* Pastinaca Secacul is the Shakakel misree (Sium Sisarum, Ainslie) so much used by Eastern doctors, and not without reason for this root is a very efficacious medicine. Dr Royle thought it came from Cashmere to Hindostan, but I heard that it is imported from Egypt; and hence, probably it is called the Egyptian (misree)—*Honigberger, p.* 322.

(6096) PATA. Leaf of Corchorus olitorius.—*Ben. Ph.* 219.

(6097) PATA ROOT. PATA KE JUR. Root of Sida Acuta.—*Ben. Ph.* 219.

(6098) PATCHOULY OR PUCHAPAT POGOSTEMON PACHOULI, is an article wel known in Bengal, and though its source was long doubtful, it is found in every bazar almost throughout India, and seems to grow abundantly as well as on the opposite shore o the Malay Peninsula, in province Wellesley, i India, and in a perfect wild state at Penang. M de Hugel found it growing wild near Canton Dr. Wallich says that it obviously belongs to the family of Labiatæ, and remarks that "whether *Marrubium Odoratissimum, Betonicoe folio* J. Burm. Thesaur. Zeylon, p. 553, tab. 71 fig 1, (Marrubium Indicum, N. L. Burman Flor. Ind. p. 127), be our plant or not, it is difficult to say"; but he thinks that there is at least a considerable affinity between them, Viney, in the "French Journal of Pharmacy," suggests that it is the Plectranthus graveolens of R. Brown. The name of the plant however is the *Pogostemon Patchouli.* The odour of the dried plant is strong and peculiar, and to some persons not agreeable, the dried tops imported into England are a foot or more in length. In Europe it is principally used for perfumery purposes, it being a favorite with the French, who import it largely from Bourbon. They were led to use it because, a few years ago, real Indian shawls bore an extravagant price, and, purchasers distinguished them by the odour of Patchouly with which they were perfumed, and on discovering this secret, the French manufacturers got in this way of importing the plant to perfume articles of their own make, and thus palm off home spun shawls for real Indian. The Arabs use and export it more than any other nation. Their annual pilgrim ship takes up an immense quantity of the leaf, they use it principally for stuffing matrasses and pillows, and assert, that it is very efficacious in preventing contagion and prolonging life. The characteristic smell of Chinese and Indian Ink, is owing to an admixture of this plant on its manufacture. Some people put the dry leaves in a muslin bag, and thus use it as we do lavender, for scenting drawers in which linen is kept; and this is the best way to use it, as this odour, like musk, is most agreeable when very dilute. In India it is used as an ingredient in Goorakoo tobacco for smoking and for scenting the hair of women. It requires no sort of preparation, being simply gathered and dried in the sun: too much drying, however, is hurtful, inasmuch as it renders the leaf liable to crumble to dust in packing and stowing on board. By distillation it yields a volatile oil, on which the odour and remarkable properties depend. This oil is in common use in India for imparting the peculiar fragrance to clothes: among the superior classes of natives in Penang it sells at the rate of a dollar and a quarter, to a dollar and a half, per pekul. In Bengal, some which was imported from Penang several years ago, sold at 11 rupees eight annas per maund. Later investments have sold at a much lower rate.

(6099) PATELLIDÆ, a family of Prosobranchiate Gasteropodus *Mollusca.* The shell is conical with the apex turned forwards; the muscular impression horse-shoe-shaped, open in front. The genera belonging to this family are *Patella, Acmæa, Gadinia,* and *Siphonaria. M.* De Blainville referred these Molluscs to his order *Cervicobranchiata,* and Cuvier to his order *Cyclobranchiata.* Ex. *P. compressa.* Inhabits the Indian Seas. Lam. The *Patellæ* are very widely spread, and few seas are without them. None however appear to have been observed in the Arctic Seas, either by Captain Parry (1819) or Captain Ross. The larger species are found principallly in warm climates.—*Eng. Cyc.*

(6100) PA-THA-YOU-SHA, a bast of Arracan strips seven feet in length; fine in texture, light coloured: formed of several easily diffusible layers: the outer layers, rather dense and compact, and the inner cancellar. A musa species? —*Royle.*

(6101) PATTUNGA CUTTAY, VATTUNGA CUTTAY.

Vattunga Cuttay, TAM.

This is a Tamul name of a wood which is used for dying cotton cloth, mats &c. of a bright red colour. The dye is fixed by means of the Chebulic Myrobalan and alum.—*Ains. Mat. Med. p.* 204.

(6102) PATOO OR ASTA, is a bast from Beerbhoom, is like the Putwa from Bhagulpore.—*Royle.*

(6103) PAUCHONTEE TREE. Isonandra Polyandra. In 1855, General Cullen forwarded a drawing and description of a large forest tree, abounding at the foot of the Ghauts N. E. of Trevandrum. The plant delineated, was evidently one of the Sapotaceæ and the Malayalim name is "pauchonthee," and the product, of which a good sample was forwarded, on examination bears a strong resemblance to gutta percha, both in external appearance and mechanical properties. At the same time Lieutenant Col. F. Cotton, Engineers, forwarded from the Neilgherries a small sample of a product similar to gutta percha in its smell, general appearance and fracture. No drawing of the tree was submitted, but a few leaves which surrounded the exudation, very closely resembled the real *Isonandra gutta.* The trees are said to be very large and numerous in the forest.—*M. E. J. R.* It seems to be a practice with the people who collect the Gutta Percha of the Malayan peninsula, to mix the juices of several other species of Isonandra with that of the true Isonandra Gutta. And though this mixture confessedly depreciates the value of the gum, as the products of the several species have, to some extent, similar properties, the adulteration allows the commercial article to be applied to many purposes in the arts, which the higher price and the scarcity of the true gum gutta would exclude it from. It was therefore with pleasure that we perused an interesting communication from Mr. Lascelles along with one from a former correspondent, Wynaadensis: for the latter confirms what had previously been surmised, the existence on the Koondahs of several species, five if not six, of this genus of useful plants. These correspondents are both inclined to believe that the true Isonandra Gutta grows in Wynaad, but we do not think that this opinion is entertained by those best capable of judging. Mr. Lascelles mentions that the scientific men there, have had some difficulty in defining the species of the tree recently discovered. Mr. Lascelles seemed too hastily to decide against General Cullen's discovery of the Pauchontee tree being the Isonandra Polyandra. For if Wynaadensis' present report be correct, that there are "*five if not six*" species of Isonandra on the Koondahs, the one sent by General Cullen may really be what it was named, although Mr. Jaffrey confined his observations to stating that the tree examined by him was the Isonandra Polyandra of Wight's Icones, thus evidently leaving it to Dr. Wight to settle the correctness of his own nomenclature. On the matter of priority of discovery, it is evident that, as with many other objects, the existence on the Western coast of India, of a Gutta Percha seems to have become known to General Cullen and Mr. Lascelles about the same time, but the former, by figuring the plant in February 1855, and sending specimens of its flower, its fruit, its leaves, and its gum, gave that prominent publicity to it without which an article may as well remain undiscovered. We formerly made some observations on the wood of this tree. We learn that the wood of the *Pauchountee* tree is in gravity not less than 55 lbs. the cubic foot, and that a bar of one inch square, with 18 inches clear of the supports, at each end, broke with a long fibrous fracture, after a weight of 440 lbs. had been imposed: —though not till this weight had for some minutes been suspended from the bar. This tenacity, we believe, is as high if not higher than that of teak. The above experiment has been made by General Cullen, who has likewise ascertained that the Pauchountee tree when tapped, two taps at every three feet, from the base to sixty feet high, or 40 taps in all, yielded in twelve hours about eight pints or pounds of the sap. This abundant flow supports Mr. Lascelles' opinion that Malabar alone will supply Gutta Percha to the world for the next quarter century, and we trust therefore that the orders recently issued by Government to protect the trees from wasteful destruction have been at once acted upon by the several authorities of the districts there.—See Report of the Madras Museum of 1856; by the Author

(6104) PAVETTA BREVIFLORA 1035; Brunonis, 1065; Indica, 148; Rothiana, 1065.

(6105) PAVETTA INDICA. Lin.

Pavatty kai, TAM.
Paputta kaia TEL.
Pappana, SANS.

An ornamental shrub 4 or 5 feet high with white flowers, timber very small.—*M. E. J. R.* The berries are considered amongst the Kais or garden stuffs of the Tamools: they are not however very palatable.—*Ainslie, p.* 243.

(6106) PAVETTA TOMENTOSA. PAVETTA. An indigenous species of pavetta, with flowers resembling a white ixora is found at Tavoy.—*Mason.*

(6107) PAVIA, is small division of the natural order *Æsculaceæ*, differing from *Æsculus* itself in little except its conversing petals and spineless fruit. It consists of small trees or bushes with yellow or red flowers, inhabiting North America, where they are called Buck's-Eye Chestnuts. They are often cultivated in shrubberies under the name of the Yellow or Scarlet Horse-Chestnut. Two species, *P. Indica* and *P. Punduana*, have also been found in the colder parts of India, but they have not been introduced into our gardens.

(6108) PAVONIA ODORATA. Wild.

Peramootie poo, TAM.
Mootopolaghum, TEL.
Bulla, SANS.

It is this flower to which Mr. Moor alludes in his "Hindoo Pantheon," under the name of Bela, (p. 450) and which he erroneously supposes to be that of a species of Jasmine It is a most delightful smelling flower, and is one of those with which the arrows of Kama, the god of love, are said to be tipped.—*Ains. Mat. Med. p.* 163.

(6109) PAVONIDÆ. a family of Rasorial Birds, to which the Peacock belongs. The genus *Pavo* of Linnæus stands next to *Didus* [DODO] in the 'Systema Naturæ,' and is immediately succeeded by *Meleagris*, which is followed by *Crax*, *Phasianus*, *Numida*, and *Tetrao.* Cuvier makes his Paons consist of the true Peacocks (*Pavo*, Linn.) and *Lophophorus.* This group is followed by the Dindons *Meleagris*, Linn.) the Peintades (*Numida*, Linn); and the Faisans (*Phasianus*, Linn., including the Cocks and Hens—*Gallus*, Briss; the true Pheasants (*Phasianus Colchicus*, &c. including *Argus*, Temm.); the Crested Pheasants (Houppiferes, Temm., *Phasianus ignitus*, fc.); the Tragopan, (*Tragopan Satyrus*, &c.); and *Cryptonyx.* The *Tetraonidæ* immediately follow. Mr. Swainson makes the *Pavonidæ*, the first family of the order *Rasores*, according to his arrangement, consist of the genus *Pavo*, with the sub-genera *Argus*, *Polyplectron*, and *Meleagris*; the genus *Phasianus*, with the sub-genera *Phasianus*, *Nycthemerus*, and *Ceriornis* (*Tragopan*); the genus *Gallus*; the genus *Lophophorus*; and the genus *Numida.* In this work, *Phasianus*, with its sub-genera, *Tragopan*, *Gallus*, and *Euplocamus*, are treated of under the title PHASIANIDÆ. Two species only of this magnificent genus are recorded, *P. cristatus* and *P. Japonensis.—Eny. Cyc.*

(6110) PAVO CRISTATUS.

Mohr, HIND.-MALL.
Annail, TAM.
Nemelay, TEL.

The Common Peacock. This is the Ταων & Ταως and of the Greeks; *Pavus* and *Pavo* of the Romans; Pavon and Pavone of the Italians; Pavon of the Spanish; Paon of the French; and Pfau of the Germans. The head is surmounted by an aigrette of 24 upright feathers. In the male the tail-coverts consist of feathers with loose barbs and of unequal size, the upper one shortest, each terminated by numerous eyes or circlets of a metallic iridescent brilliancy:

these the bird has the power of erecting into a circle or wheel, which presents, when the sun shines on it, an object of dazzling splendour which sets all description at defiance. The female has the aigrette, but has not the splendid ornament with which the male is gifted; her colours generally are sombre. This species is spread over the north of India and the islands of Malaisia in its natural state. It is the Mohr of the Mahrattas, according to Colonel Skyes, who describes the wild bird as abundant in the dense woods of the Ghauts; it is readily domesticated, and many Hindoo temples in the Dukhun (Deccan) have, he tells us, considerable flocks of them. On a comparison with the bird as domesticated in Europe, the latter, both male and female, was found by the Colonel to be identical with the wild bird of India. Colonel Williamson, in his account of peacock-shooting, states that he had seen about the passes in the Jungletery district surprising quantities of wild pea-fowls. Whole woods were covered with their beautiful plumage, to which the rising sun imparted additional brilliancy. Small patches of plain among the long grass, most of them cultivated, and with mustard, then in bloom, which induced the birds to feed, increased the beauty of the scene. "I speak within bounds," continues Colonel Williamson, "when I assert that there could not be less than twelve or fifteen hundred pea-fowls, of various sizes, within sight of the spot where I stood for near an hour."—*Eng. Cyc.*

(6111) PAVO JAPONENSIS. Aldrov. (*P. Javanicus*, Horsfield.) Mr. Bennett, who had an opportunity of examining two living birds in the garden of the Zoological Society of London, in addition to stuffed specimens, gives the following accurate description of this species. Prevailing tints blue and green, varying in intensity and mutually changing into each other according as the light falls more or less directly upon them. In size and proportions the two species are nearly similar, but the crest of *P. Javanicus* is twice as long as that of *P. cristatus*, and the feathers of which it is composed are regularly barbed from the base upwards in the adult bird, and of equal breadth throughout. Head and crest interchangeably blue and green. A naked space on the cheeks, including the eyes and ears, is coloured of a light yellow behind, and bluish-green towards its fore part. The feathers of the neck and breast, which are broad, short, rounded, and imbricated like the scales of a fish, are at their base of the same brilliant hue as the head, and have a broad, lighter, somewhat metallic margin; those of the back have still more of the metallic lustre. The wing-coverts are of the general hue, with a deeper tinge of blue; the primary quill-feathers are light chestnut. The tail-feathers and their coverts (train) are of a splendid metallic brown, changing into green; their barbs are extremely long, loose, silky, and somewhat decomposed; and the latter are almost all terminated by ocellated spots similar to those which mark the tail (train) of the common species, and of nearly the same size. As in it, they are of beautiful deep purple in the centre, which is about the size of a shilling; this is surrounded by a band of green, becoming narrow behind, but widening in front, and filling up a kind of notch that occurs in the blue; then comes a broad brownish band; and, lastly, a narrow black ring, edged with chestnut, all beautifully metallic, or rather representing the hues of various precious stones when viewed in certain lights. Bill of a grayish horn-colour, rather longer and more slender than in the common species; iris deep hazel. Legs strong, naked, reticulated, dusky black; spurs large and of the same hue. ('Gardens and Menagerie of the Zoological Society.') The bird above described is the *Pavo muticus* of Linnæus, who, as the name implies, described it as being devoid of spurs, relying probably on Aldrovandus, whom he quotes, and who figures it without spurs, describing it under the name of *Pavo Japonensis*. It is the Japan Peacock of Latham, the *Pavo spiciferus* of Vieillot, the *Pavo Aldrovandi* of Wilson, and *Pavo Javanicus* of Dr. Horsfield, who saw it in Java. Of these names, that of Aldrovandus has the priority; then comes that of Linnæus, which may mislead; then that of Horsfield; then that of Vieillot. We do not see anything objectionable in the name given by Aldrovandus, and therefore we have retained it.

(6112) *Meleagris* (Linn).—The Meleagris of the ancients was not a turkey, but a guinea-fowl. (Linnæus however having given this as the generic name for the Turkeys, which were not known to the ancients, ornithologists have continued it.) Nor is this now of much consequence, certainly not of sufficient importance to change the name; for notwithstanding the confusion and doubt thrown over the subject by the learned discussions of the earlier modern ornithologists, it is generally known and satisfactorily proved that the Turkeys were only known to Europeans after the discovery of America, from which one species has been spread in a domesticated state over the greatest part of the civilised globe. It has the following generic characters:—The bill rather short, strong, curved, convex, vaulted, its base furnished with a naked skin; a fleshy caruncle surmounting the bill of an erectile nature and conical form. Head and neck surrounded with a wrinkled mammillated skin, hanging loose like a dewlap as far as the upper part of the breast. Hind toe touching the ground. Two species are known: one, *M. Gallopavo*, the original stock from which the domesticated turkey is derived; the other, *M. ocellata*, a much more beautifully plumaged bird, did not exhibit in the only known specimen any trace of the tuft of hair on the breast. That character therefore is omitted above; but it is not certain that the last-mentioned species is entirely without the tuft, for the plumage of the specimen was damaged.

(6113) *M. Gallopavo.* This is the *M. occidentalis* of Brtram; *M. fera* of Vieillot; Gallo d' India, Gallinaccio (male), Gallina d' India (female) of the Italians; Coq d'Inde and Dindon, Dinde (female), of the French; Indianische Hahn of the Germans; Wild Turkey and Domestic Turkey of the British and Anglo-Americans.

(6114) *Polyplectron* (Temm). This beautiful form was raised to the rank of a genus by M. Temminck, who established it upon the bird which was named *Pavo Tibetanus* by Brisson, the Chinese Peacock-Pheasant by Edwards, *Pavo bicalcaratus* by Linnæus, and L'Eperronier by Buffon. Cuvier placed it among the Peacocks, properly so called, but other species have been since discovered, which, throwing further light upon the modifications of form, well justify its genuine separation. It is the *Diplectron* of Vieillot. —*Eng. Cyc.*

(6115) *Polyplectrum Emphanum.* Male, Length about 19 inches. Forehead and crown ornamented with a crest of long, narrow, loose feathers, which together with the plumage of the neck and breast, are rich bluish-black with metallic reflections. Towards the end of each feather there is a blackish bar. This beautiful and ample tail is supposed not to be erectile, but to be capable of very wide expansion. This is the Eperonier a Toupet of M. Temminck; the Crested Polyplectron. Probably inhabits Sunda and the Molucca Isles.—*Eng. Cyc.*

(6116) *Polyplectron Tibetanum.* This is the *Pavo Tibetanus* of Brisson and Gmelin, the Chinquis of Buffon, the Thibet Peacock of Latham, the Peacock Pheasant of Edwards, and the Eperronier Chinquis, Polyplectron Chinquis of Temminck. It is supposed to be a native of the mountain chain which separates Hindustan from Tibet. In the *Polyplectron Chalcurum* the plumage is comparatively sombre. The ocellated spots on the wings and tail are absent, and the latter, instead of being rounded, has a more elongated pheasant-like form, approaching to that of *Argus.* The beautiful birds above briefly noticed, and inhabiting the Indian Islands or China, are described as being almost as hardy as the Peacock, and there is little doubt that they might be domesticated in England. The Tibetian Polyplectron is procured for the aviaries of the wealthy Chinese, and M. Temminck's drawing was taken from a bird that had lived for five or six years in an aviary at the Hague.

(6117) *Argus* (Temm.). The only species known is *Argus giganteus.* This bird is remarkable for the beauty of its plumage. The wings, the secondaries of which are three times as long as the primary quills, are painted and ocellated in a manner that defies description. This bird is the beautiful Chinese Pheasant described in 'Phil. Trans.,' vol. 55, p. 88; L'Argus ou Luen of Buffon; Argus Pheasant, *Phasianus Argus* of Latham; L'Argus, *Argus giganteus* of Temminck. The unwieldy size of the secondaries forms an impediment to the bird in its progress through the air, but they assist its pace when running, which it does swiftly with their aid. Its flight, when it does rise on the wing, is heavy and short. When the bird is at rest or unexcited, the beauty spots on the secondaries are hardly visible; but when showing himself off in the presence of his females, the wings of the *Argus* are expanded, and trailed upon the ground to display their beauties; and at this time the tail is comparatively spread, and is raised erect; when at rest it is carried in a line with the body, and with the two long feathers folded together. The rest of its habits are not known, but it is said not to thrive well in confinement. It is a native of Sumatra, and probably other Indian Islands, but principally of Malacca. No proof appears of its having been brought from China and Chinese Tartary, although ornithological writers name those countries as the places of its habitation. The feathers and drawing of the bird described in the 'Phil. Trans.' by G. Edwards were sent from Canton to Dr. Fothergill, and are stated to have come from one of the most northern provinces of China.

(6118) *Lophophorus,* Temm. (*Monaulus* Vieill.)

(6119) *L. Impeyanus* (*L. refulgens,* Temm.; Impeyan Pheasant, *Phasianus Impeyanus,* Lath.) We must refer our readers to the bird itself, or to the excellent figure in Mr Gould's 'Century of Birds from the Himalaya Mountains,' for anything like an adequate idea of the beauty of its tints; for the greater proportion of the plumage is dazzling with changing hues of green, steel-blue, violet, and golden-bronze. The bird looks as if it were principally clothed in a scale-armour of iridescent metal; but the plumage is soft and velvety to the touch. The crest on the head consists of naked-shafted feathers, with an oval or battledore tip of the same quality as the rest of the plumage, and of a metallic green; the centre of the back is pure white; the tail is rounded and bright chestnut. Size of a hen turkey. The principal food of this species consists of bulbous roots, for scooping out which its bill is well adapted. Nothing certain seems to be known of the rests of its habits. It is a native of the mountain ranges of Nepaul and the Himalayas.

(6120) *Numida* (Linn.). The birds known to the ancients under the name of *Meleagrides* and *Gallinæ Numidicæ* belonged to this genus. They are all natives of Africa, living principally on berries, small slugs, &c.

(6121) *N. Meleagris* (the Gallina di Numidia of the Italians; Poulle de la Guinee and Peintade Meleagride of the French; Pintado of the Spanish; Perl Huhn of the Germans; and Pearl Hen, Guinea Hen, and Common Guinea Fowl of the English) is too well known to need description. The bird has been spread very widely, and few poultry-yards are without it. In Jamaica, where they do much mischief to some of the crops, they have resumed their wild habits, and are shot like other game.—*Eng. Cyc.*

(6122) PAYA WOOD. Paya kurra.

(6123) PAYUNG in Malay and Javanese, and Songsong in Javanese only, an umbrella. This is the universal badge of rank from the prince to the humblest office-bearer among the civilised nations of the Malayan Archipelago, and stands instead of the crowns, coronets, stars and ribbons of the nations of Europe. The quality of the party is expressed by its size, colour, or material.—*Crawfurd Dict. p.* 330.

(6124) PEACH, AMYGDALUS PERSICA. Amongst the more important of the acquisitions which, says Fortune, I made in the vicinity of Shanghae, I must not forget to mention a fine and large variety of peach, which comes into the markets there about the middle of August and remains in perfection for about ten days. It is grown in the peach orchards, a few miles to the South of the City; and it is quite a usual thing to see peaches of this variety eleven inches in circumference and twelve ounces in weight. This is probably, what some writers call the Peking peach, about which some exaggerated stories have been told. Trees of the Shanghae variety are now in the garden of the Horticultural Society of London.—*Fortune's Wanderings, p.* 401

(6125) PEACH PALM. (Guilielma speciosa), the " Pupunha, produces an agreeable fruit of a red and yellow colour."—*Seeman.*

(6126) PEACH WOOD, NICARAGUA. An inferior kind of brazil-wood, used to dye a fugitive " fancy red."—*Waterston.*—*Faulkner.*

(6127) PEACOCK, in Malay and Javanese, Marak, and in the polite dialect of the latter, Manura, which is Sanscrit. The bird known by this name is the Pavo muticus of ornithologists, and a distinct species from the Indian one which is that of our poultry-yards. It appears to be confined to Java, Sumatra, and the Malay Peninsula, and has never been domesticated by the natives of the Archipelago.—*Crawfurd Dictionary, page* 330.

(6128) PEAH SAUL OR YEGASEE.

Yagassee, TEL.
Peeah saul, HIND.

(6129) PEAR, PYRUS COMMUNIS.

(6130) PEARLS.

Looloo, ARAB.
Mootoo, CYNG.
Paarlen, DUT.
Perles, FR.
Margaritæ, LAT.
Murwareed, PERS.
Shemtschug, Perlu, RUS
Perlas, SP.
Perlet, GER.
Mooltee, GUZ. HIND.
Perle. IT.
Motu, TAM.
Motu, TEL.

Are well-known globular concretions found in several species of shell fish. They consist of alternate concentric layers of membrane and carbonate of lime. The best pearls are of a clear bright whiteness, free from spots or stains, with the surface naturally smooth and glossy. Those of a round form are preferred, but the larger pear-shaped ones are esteemed for earrings. *Seed* pearls are those of the smallest size. The most extensive pearl fisheries are those of the Gulf of Manaar in Ceylon, and Bahreen in the Persian Gulf. Pearls are imported into Bombay from the latter place, and are re-exported to England and China.—*Faulkner.* Pearls are fished up on nearly all parts of the Ceylon coast and are frequently large and beautiful. The Chinese taught the natives their value by offering them very high prices for the finest qualities. The pearl fisheries for which the Island was once famous have very much diminished in their yield. The natives account for the diminition by declaring that the pearl oyster has the power of locomotion and has shifted its former quarters to some new ground not yet discovered. The scarcity is probably owing to the fact that the pearls have been disturbed before they have reached their full development which is said to require a period of seven years. Since that period the proceeds have gradually fallen off until at present they amount to almost nothing. Diving for the pearl-oyster is a favorite occupation among the natives of Ceylon, as a skilful diver can earn ten times the wages of a farm laborer, and the employment is not, as has been stated, unfavorable to health, but on the contrary conducive to strength and vigor of body.—*American Expedition.* Pearls are found in China; and Marco Polo speaks of a salt lake, supposed now to be in Yunan, which produced them in such quantity that the fishery in his day was farmed out and restricted lest they should become too cheap and common, but such is not now the case judging from the numbers annually imported from India. The Quarterly Review speaks of an artificial mode practised by the Chinese of making pearls by dropping a string of small mother-of-pearl beads into the shell which in a year are covered with the pearly crust.—*William's Middle Kingdom, p.* 272.

Pearls, to the amount of £100,000, are annually brought to Canton; *coral* is also a part of cargoes from the Archipelago to China.—*Williams.* Pearls are obtained from a shell-fish, commonly called the pearl oyster." The principal fisheries are on the Coast of Madura, the Strait between Ceylon and the Continent, the Island of Baharen, in the Persian Gulf, and at Hainan, on the Coast of China. The pearl divers pile the shells upon the shore in little pits, and cover them with sand, till the shell opens, and the fish is destroyed. The pearls are then procured, cleansed, and passed through a kind of sieve, according to their sizes: the smallest are denominated *seed* or *ounce* Pearls, and are of very inferior value. The quality or value of Pearls depends chiefly upon their size and colour. Their true shape is a perfect round. The colour should be a pure white; not dull and lifeless, but clear and brilliant; free from foulness, spot, or stain; surfaces naturally smooth and glossy. The shell, which is the *Mother of Pearl*, is compressed and flat, nearly orbicular; the inside exquisitely polished, and of the whiteness and water of the pearl itself. It has the same lustre on the outside, when the external coats have been removed by aquafortis. It is used (especially by the Chinese and Japanese) in a variety of inlaid works, toys, &c.—*Morrison.* Pearls worth fishing are found in the seas about the Arrow Islands, and in those of the Sulu Archipelago, but none in size or quality to be compared with those of the Manar or Persian gulfs. Mother-of-pearl oysters are found in the same situations and on the coasts of several of the Bisaya islands of the Philippines much more abundantly. From Manilla there are yearly exported about £ 200,000 pounds worth of them. Mr. Windsor Earl has given the following very satisfactory account of the fishing of the Arrow Islands on the coast of New Guinea. "But the great sources of wealth are the pearl and tripang banks, which lie on the eastern side of the group, and are often several miles in width, being intersected by deep channels some of which will admit vessels of burden. The pearl oysters are of several varieties; first, the large oyster with its strong thick shell from six to eight inches in diameter which furnishes the mother of pearl shell of commerce. These are obtained by diving and are highly prized, being nearly always in demand at Singapore for the European and Chinese markets. This oyster produces few real pearls, but gnarled semitransparent excrescences are occasionally found on the surface of the inner shell, which are so highly esteemed by the Chinese that they often fetch enormous prices. The other description is the small semitransparent pearl oyster, having the inner surface of the shell of a bluish tint. The shell is of small value as an article of commerce, but the oyster itself often contains pearls which although individually of no great value, are so numerous, as amply to repay the labour of collection. Pearls of sufficient size to undergo the process of boring are sometimes found, but the greater portion are what go by the name of seed pearls, and are only marketable in China, where they are much valued as a medicine when pounded and mixed with some liquid." Journal of the Indian Archipelago, Vol. iv. p. 490. The names for the pearl in Malay and Javanese, mute, mutya, and mutyara, are all Sanscrit, and I am not aware that in any of the Malayan languages there are native names for it. Occasionally the Persian word lulu is used. The name for the mother of pearl oyster, indung-mutyara, is exactly equivalent to our own, for the Malay word indung signifies mother or matrix. From this we may suppose that both the pearl and mother of-pearl were most probably made known to the Malayan nations by the Hindus. It may be remarked, that the pearl-fishing of the Sulu Islands was certainly carried on before the arrival of Europeans, for they are mentioned by the indefatigable Barbosa. "Going on." says he, "in a northerly direction towards China, there is another island abounding in the necessaries of life called solar (Sulu) inhabited by a gentile people almost white, and in person well made. They have their own proper king and language. In this island is found much gold by washing the soil, and over against it, the people go to fish small pearls, and even find occasonally larger ones, fine as to colour and roundness." Ramusio, Vol. i.—*Crawfurd, Dictionary page* 330.—*Eng. Cyc.* The pearl is a shell secretion of a spherical shape formed in a species of oyster, or pearl mussel, and said to be produced by a malady in the animal, which requires nearly seven years for its full development, after which the oyster dies. Small pearls which have been immersed in acetous acids, and thus reduced to their membranous constituents, have the appearance of being formed of concentric coats of membrane, and carbonate of lime, thus resembling in composition the mother-of-pearl with which oyster-shells are lined. The precise origin of pearls is unknown, but it appears probable that some minute substance, such as a grain of sand, may have found its way into the shell and produced irritation, and that the animal, unable to expel it, renders it less injurious by covering it with calcareous matter. It is sometimes affirmed, that to produce pearls, the oyster must have received some external injury: and this is corroborated by the fact that nearly all the shells in which pearls are found are outwardly contorted, and that a smooth regular shell is a pretty sure sign of the absence of the pearl. It was therefore suggested to the Swedish government by the celebrated Linnæus, to pierce small holes in the shell of the freshly-caught pearl oyster, and then restore it to its original bed. The experiment was tried, but without success. A somewhat similar plan is said to be adopted by the Chinese, and with favourable results. These ingenious people thread upon fine silk small beads of mother-of-pearl, and fasten them within shells of pearl oysters, when they rise to the surface of the water at the beginning of summer. The animals are then restored to their bed, where they soon cover the beads with calcareous matter, and thus convert them into pearls. In whatever way produced, pearls of considerable size, on account of their beauty and rarity, have been valued at enormous prices in past ages, and are still among the choicest objects of the jeweller's art. Their delicate and silvery lustre has been as widely celebrated as the brilliance of the diamond. The Hindoos poetically describe them as drops of dew falling into the shells when the fish rise to the surface of the sea in the month of May, and becoming by some unexplained action of the sun's rays transformed into pearls. Pearl fisheries exist in Ceylon, on the Coromandel coast, and in the Persian Gulf, the last-named being the most productive. Fisheries of less importance also exist in Algiers, and in the Zooloo Islands. Two thousand years ago, the Romans found pearls in Britain, and in modern times the rivers of Scotland have afforded considerable quantities, though not of the best quality. Several rivers, of Saxony, Silesia, Bavaria, and Bohemia afford pearls, and they are also found in two or three Russian provinces. There are also pearl fisheries in the western hemisphere. The coast of Columbia and the Bay of Panama have furnished considerable quantities, but they are not considered equal to the pearls of the East in shape or colour. Detailed accounts of the pearl fishery of Ceylon have been given by the Count de Noe and others, who have had ample means of watching the operations of the pearl-divers during a residence in that island. It appears that the pearl oysters occur in banks at greater or less depth in the sea on the western side of the island of Ceylon, the average depth, however, being about 12 fathoms, and the distance from the shore about 15 miles. The right to fish on these banks is sold by the Government every season, and single auction sale is generally made to one individual, who afterwards disposes of shares in the fishery to other parties. The biddings at the auction are regulated by the produce of some thousands of oysters taken from the beds at hazard. If the average quality of pearl contained in them be good, the competition is strong in proportion. The pearl fishery commences in April and lasts till towards the end of May. It attracts a concourse of visitors not only from the interior of the island, but from various parts of India, whose diversities of language, dress, and manners produce a striking effect. The sea-shore, at other times solitary, is on the eve of the fishery suddenly covered with innumerable huts, composed of a few poles stuck in the ground, interwoven with bamboo and covered with the leaves of the cocoa-nut palm: these temporary dwellings often shelter as many as 150,000 persons. The signal for commencing the fishery is given at day-break by the firing of cannon, and at that moment the several boats cast anchor in the fishing ground, for at midnight they had left the shore in an extensive fleet, so as to be on the spot at the desired moment. Each boat has its own proper bounds, beyond which it is not lawful to work, and government vessels are on the spot to see that no infringement of contract takes place. The boats each carry a captain, pilot, and 20 men, of whom 10 are experienced divers. 5 divers descend at once, the other 5 taking the plunge when the first ascend. Thus a little time is allowed for regaining strength. In order to descend as rapidly as possible through the water, the diver places his feet on a large stone made fast to one end of a rope, the other end being secured to the boat. He also takes another rope, to the end of which is attached a net, or basket, to contain the oysters. The upper extremity of this second rope is held by two men in the boat. The diver is also provided with a strong knife for detaching the oysters, and as a means of defence against sharks, which are very numerous in those seas, but which do not often attack the divers, being perhaps scared by the noise of the assemblage, and the continual plunging of so great a number of persons. The diver no sooner reaches the ground than he gathers oysters with all possible speed into his basket, and then letting go the rope to which the stone is attached, he pulls that which is held by the sailors, and rapidly ascends to the surface. Some divers make very dexterous use of their feet, holding the net with one foot, clasping the stone with the other, and thus leaving one hand free to close the nostrils, while the other hand holds the rope in descending. The time during which the divers can remain submerged is variously stated, and no doubt it differs greatly according to the constitution of the individual. Some observers declare that in their experience it never exceeded 50 seconds; but Captain Percival, in his work on Ceylon, gives two minutes as the usual time of remaining under water. Dr. Faraday found that by first exhausting the lungs, by several deep exhalations, so as to expel the carbonic acid, and then taking deep inspiration of fresh air, he was able to hold his breath for two minutes and a half. Serious effects are produced by this employment, and the divers may frequently be seen with blood issuing from their mouth and nostrils. Yet this does not hinder them from going down in their turn. They will make from 40 to 50 plunges in one day, and bring up on each occasion about 100 oysters. Their day closes before noon, for as soon as the sea-breeze sets in, the signal is given for the return of the boats to the shore. Their owners, and a large assemblage of persons of all classes, are eagerly looking out for the arrival of the flotilla, and are soon busily employed in examining and stowing away the cargoes. Each owner has a shallow pit fenced round and secured for his own use, in which his store of oysters is deposited, and left open to the air. This pit, or *coutto* as it is called, is in the midst of a group of huts belong-

ing to the same owner, so that it is under the guard of his party. Here the oysters are allowed to putrefy under a burning sun, and a stench arises from them which would seem enough to depopulate the shore of its thousands of inhabitants. Yet such is not the case. The health of the people does not appear to be materially affected, and the oysters are allowed to remain till dry, when they can be easily opened and the pearls extracted. To open them when fresh would require much greater force, and would be likely to injure the pearls. When the putrefaction is sufficiently advanced, the oysters are taken from the *coutto,* and placed in troughs made of the trunks of trees. Sea-water is thrown over them: they are easily opened, and render their pearls to the washing and shaking of a number of men who stand all on one side of the trough, while inspectors at each end closely watch their proceedings, and other inspectors examine the shells which are thrown away, lest they should contain some of the precious substance. The workmen engaged in washing pearls dare not lift their hands to their mouths under penalty of a flogging, yet a man will sometimes contrive to swallow a pearl of high price. After all the pearls are washed out, the largest are carefully picked out from the sand at the bottom of the troughs and washed repeatedly in clean water: the next in size are spread out on white napkins to dry in the sun. The remainder are left to the care of women, who pick them up and dry them. Pearls are assorted by means of three sieves placed one above another, the meshes in which are smaller as the pearls descend. Thus the pearls which will not pass through the uppermost sieve are of the first class, and so on with the others. Another assortment is made as to colour, regularity of form, &c., and here the tastes of different nations have to be consulted. The Europeans prefer pure white pearls, the Indians yellow pearls, and the natives of Ceylon those which are tinged with rose-colour. Besides the number of persons who arrive in Ceylon in the fishing season for the sake of speculating in pearls, there are also numerous Indian artisans who are very expert in piercing and drilling pearls, and who practice their trade on the spot on economical terms. Captain Percival thus describes their operations:—"A machine made of wood, and of a shape resembling an obtuse inverted cone, about 6 inches in length and 4 in breadth, is supported upon 3 feet, each 12 inches long. In the upper flat surface of this machine holes or pits are formed to receive the larger pearls, the smaller ones being beat in with a little wooden hammer. The drilling instruments are spindles of various sizes, according to that of the pearls; they are turned round in a wooden head by means of a bow handle, to which they are attached. The pearls being placed in the pits which we have already mentioned, and the point of the spindle adjusted to them, the workman presses on the wooden head of the machine with his left hand, while his right is employed in turning round the bow handle. During the process of drilling he occasionally moistens the pearl by dipping the little finger of his right hand in a cocoa-nut filled with water, which is placed by him for that purpose; this he does with a dexterity and quickness which scarcely impede the operation, and can only be acquired by much practice. They have also a variety of other instruments both for cutting and drilling the pearls. To clean, round, and polish them to that state in which we see them, a powder, made of the pearls themselves, is employed. These different operations in preparing the pearls occupy a great number of the black men in various parts of the island. In the black town or pettah of Columbo, in particular, many of them may every day be seen at this work, which is well worth the attention of any European who is not already acquainted with it."
—*Tomlinson.*

(6131) PEARLS, ARTIFICIAL. The art of making artificial pearls has been brought to such perfection in Paris, that even jewellers and pawnbrokers have occasionally had a difficulty in deciding between the artificial and the real. The origin of this successful imitation is given as follows:—A French bead maker named Jaquin, observing that when the small fish called *ablette,* or bleak (*Cyprinus alburnus*), was washed, the water was filled with fine silver-coloured particles, collected some of these for the purposes of his trade. He found that the soft shining powder thus obtained had to a remarkable degree the lustre of pearls; hence, he called it essence of pearl, or *essence d'orient.* He first made small beads of gypsum and covered them with this substance: they were greatly admired and eagerly sought after; but it was found that this pearly coat, when exposed to heat, separated itself from the bead, and attached itself to the skin of the wearer, in a manner that was anything but pleasant. The ladies themselves, it is said, suggested to Jaquin, the making of hollow glass beads, and covering the inside with essence of pearl. This he did, and established a manufacture, of which some idea may be gained by the following account. Slender tubes of glass are first prepared, called *girasols,* a term applied to opal, and sometimes to the stone called cat's-eye, and given to these tubers because the glass is of a peculiar bluish tint. From these the artist blows minute globules, to the extent of from two to six thousand per day, not caring to make them all perfectly regular, or free from blemish, because the natural pearls are not so. The pearl essence is then mixed with a solution of isinglass, and is blown while hot into each bead by means of a fine glass pipe. The solution is spread equally over the whole internal surface, by shaking the pearls in a vessel placed over the table where the workman sits, and to which he gives motion by nis foot. When the varnish is equally diffused md dry, the beads are filled with white wax; his gives them the necessary weight and solidity, nd renders them less fragile. They are then bored with a needle, and threaded on strings for sale. The holes in the finer sort are lined with thin paper, that the thread may not adhere to the wax. To produce one pound of scales no fewer than .900 fishes are required; but this quantity of cales only yields 4 ounces of pearl essence. The fish are about 4 inches long; they are sold t a cheap rate in the markets after being deprived f their scales. The value of a pound of washed cales in the Chalonnais is from 15 to 25 livres The early manufacturers suffered great inconenience from not knowing how to preserve the cales from putrefaction, and consequently being bliged to use the essence immediately it was btained, lest it should acquire the intolerable dour of decayed fish. Attempts were made o preserve them in spirit of wine or brandy, but hose liquors wholly destroyed their lustre. At ngth it was discovered that these fishy particles n be kept for a long time in solution of amonia, and this enables the manufacturers of tificial pearls to carry on a considerable traffic ith distant places where the fish is plentiful, the pply from the Seine, though abundant, being sufficient for the purposes of the trade of Paris. own to a late period the heirs of M. Jaquin ontinued to manufacture pearls to a considerale extent, in the Rue de Petit Lion, at Paris. n elaborate account of this art is given by De eost in a work entitled. "*L'Art d'imiter les erles fines,*" from which most English descripons of this manufacture have been obtained.—*omlinson.*

(6132) PEARLASH. The term is applied to lcined potash. It has a spongy texture, and whitish pearly lustre. Pearlash, can be prepared om nitre and charcoal.

(6133) PEARL, MOTHER OF.

Seepie Moothoo, Tam.
Gohur parvur, Pers.
Indong Mootiara, Malay.
Sudf, Hind.

Mother of Pearl is commonly sold by the abbie Stone Merchants, cut into beads and her ornaments which first they call Surat unnie, owing to their being brought from Su-.—*Ains. Mat. Med.* *False pearls* are sent om China to India for ornaments, as well as nployed by the Chinese.

(6134) PEASE. Pisum Sativum.

Erwten, Dut.
Pois, Fr.
Erbsen, Ger.
Buttana, Guz. Hind.
Piselli, It.
Wan, Jap.
Kirseneh, Pers.
Goroch, Rus.
Harenso, Sans.
Pesoles, Guisantes, Sp.
Goondoo Sanigheloo, Tel.
Puttanie, Tam.

The product of a well-known leguminous plant, of which two species are commonly distinguished in Britain; the grey field pea, and the white or yellow pea. Of these two species there are many varieties. Leguminous crops are very extensively cultivated in India.—*Faulkner.*

The large white, green, and brown, are now, the common pea in the Deccan; the latter sort are boiled and eaten often in the shell. Peas may be sown in the beginning of June, and continued at pleasure until February, when the weather becomes warm and the stalks dry up, although I have known peas to be had much later in the sheltered gardens in the city of Aurungabad. The method of sowing is very simple; they should not be too thin, or placed deeper in drills than two inches, and a space of three feet between the rows. I generally sow my first crop in double rows, with a space of a foot between: when they are ready to climb, I earth up both sides well, leaving room for the water to run in the middle. I then place good strong sticks in the centre of the rows, and on the outer side of each lay good old manure, after which little trouble is required. Keeping them free from weeds is of course essential, and if you wish to preserve the seed, take care and remove any of the plants that appear of a different kind when in blossom; also draw out all the thin and bad looking plants, to prevent the pollen inpregnating the good, and if this seed be the produce of the rain crop, you will find that if sown again in the cold weather they will be much finer and last longer than the seeds of the former season. I was led to observe this from seeds that had fallen and grown up of themselves. If you sow for late crops, I recommend their being put down in single rows, and the lines from east to west: this enables the sun to act upon the whole, and tends to prevent mildew from damp on the stalks. In growing crops that you do not intend to stick, it is advisable to put brushwood on one side for them to creep over, and prevent much loss in seed from damp and otherwise.—*Riddell* The kinds that grow best at Madras are the Bangalore and Cape seed, sown in drills after the heavy rains are over. The best manure for this vegetable is street sweepings and wood ashes: do little good at Madras after the middle of February. May be sown successively once a fortnight during the cold months. Native country unknown.

The *Japan pea* has been introduced into the United States, and return two and three hundred per cent. Agricultural Report for 1854 from Commissioners of Patents to House of assembly.

(6135) PEAT. A kind of fuel, composed chiefly of the decayed fibres of mosses.—*Faulkner.* On our arrival at Calcutta in the following February, Dr. Falconer showed us specimens of very modern peat, dug out of the banks of the Hoogly, a few feet below the surface of the soil, in which were seeds of the *Euryale* ferox : this plant is not now known to be found nearer than Dacca (sixty miles North East, see p. 255), and indicates a very different state of the surface at Calcutta at the date of its deposition than that which exists now, and also shows that the estuary was then much fresher.—*Hooker*. This peat Dr. Falconer also found to contain bones of birds and fish, seeds of *Cucumis Madrazpatana* and another Cucurbitaceous plant, leaves of *Saccharum Sara* and *Ficus cordifolia*. Specks of some glistening substance were scattered through the mass, apparently incipient carbonisation of the peat.—*Hooker Him. Jour. Vol.* II. *page* 341.

(6136) PECTINIDÆ. OR OSTREIDÆ, a family of Conchiferous *Mollusca*, to which the common Oyster belongs. It has the following characters:—Shell inequivalve, slightly inequilateral, free or adherent, resting on one valve; beaks central, straight; ligament internal; epidermis thin; adductor impression single, behind the centre; pallial line obscure; hinge usually edentulous. Animal marine; mantle quite open, very slightly adherent to the edge of the shell; foot small and byssiferous, or obsolete; gills crescent-shaped, two on each side; adductor muscle composed of two elements, but representing only the posterior shell-muscle of other bivalves. (Woodward.) The principal genera referred to this order are—*Pecten, Ostrea, Lima, Placuna, Anomia, Placunomia, Hinnites, Spondylus*, and *Plicatula*.

Pecten (Lamarck).

(6137) PECTEN PLEURONECTES. Shell sub-equivalve, rather thin, smooth externally somewhat convex on both sides. This species has the upper valve always coloured, generally reddish or rich reddish-brown and the lower one white, whence its name. In the inside of the valves are projecting radiated somewhat distant ribs. It is found in the East Indian seas, and fossil in France, at St. Paul-Trois-Chateaux, in the department of Drome.—*Eng. Cyc*.

(6138) PECTEN SPONDYLOIDEUM, is the only species. The shell is ovato-cuneiform, planulate; whitish tinged with red or purplish, especially near the umbones; the upper valve flat and striated longitudinally; the lower valve largest, with the lateral edges turned up and raised above those of the upper valve. There is a smaller variety, much more round, and generally more delicate. It is a native of the East Indian Seas (Isle of France, &c.), where it is found half-imbedded in coral-reefs.

(6139) *Ostrea* (*Gryphœa* (Lam.), fossil principally;

(6140) *Exogyra* (Say), fossil only).

(6141) *Placuna* (Brug.).—Animal very much compressed. The species now known are from the East Indian and Red Seas, and have been taken on sandy bottoms. M. Deshayes remarks that the animal is not known, but that he is convinced that it has a great analogy to that of *Anomia*. The number of species recorded in the list of M. Deshayes is three living and one fossil (tertiary).

(6142) PEDALIACEÆ, a natural order of Monopetalous Exogenous Plants, very nearly related to *Verbenaceæ*, having like it irregular and usually didynamous flowers and a few-seeded 2- or 4-celled fruit; but differing in having the radicle directed towards the base instead of the apex of the fruit. From *Bignoniaceæ*, with which they are more generally compared, their wingless seeds offer the principal distinction. They are all exotic tropical herbaceous plants, with opposite leaves and axillary flowers, and are of little known use, with the exception of the genus *Sesamum*, whose seeds afford a bland oil not inferior, when fresh, to that of the olive. [SESAMUM.]

(6143) PEDALUM MUREX. An infusion of this Pedalium,—*Gokeroo*, is a good mucilaginous demulcent, much used by the natives as a drink in gonorrhæa.—*Beng. Phar. p* 304.

(6144) PEDALIUM MUREX. Nat. BURRAY-GOKERROO. A succulent plant, with small yellow flowers which appear in the rains, the green leaves when agitated in water render it mucilaginous: this is prescribed by the natives in dysuria, the seeds are supposed to possess similar virtues.

(6145) PEDALIUM MUREX. PRICKLY FRUITED PEDALIUM. Lin.

Ananeringie, TAM.
Burra gokeroo, HIND. and DUK
Khussuke kubeer, ARAB
Yeanugapulleroo, TEL.
Ghejasoodumoostra, SAN

A pretty large plant, with small yellow flower which appear in the rains.—*Riddell*. Succulent ramous, annual, growing generally over th country, but chiefly on the Coromandel coast, i a moist sandy soil; flowers in the rainy and co seasons. The fresh leaf of this plant, when agitated in water, renders it mucilaginous, in whic state it is prescribed by the natives, in cases o Dysuria and Ischuria. The seeds which ar contained in the prickly capsule are supposed t have similar virtues and are administered in decoction. This plant is called Caca Mullu in th Hort Mal.—*Ains. Mat. Med. page* 69. Th fresh plant renders water or milk very mucilaginous without altering the taste, colour, o smell of the liquid. This thickening disappear in a few hours. A watery infusion of this kin sweetened with sugar is a favourite and excellen native demulcent in acute gonorrhœa. Butte milk is often fraudulently thickened by the use the leaf. *Roxb. Fl. Ind.* iii. *p.* 114.—*O'Shaughnessy, page* 480.

(6146) PEDDA JANY.

Pidde janee, TEL. | Buree janee, HIND.

(6147) PEDDA NEERODEE.

Pidda neroodee, TEL. | Burree neerodee-

(6148) PEDDA TAPASEE.

Pidda tapasee, TEL. | Burree tapasee, HIN

(6149) PEDDAWK WOOD.

Peddawkoo kurra, TEL.

(6150) PEDILANTHUS TITHYMALOIDES, JEW BUSH. West Indies. Introduced into the Calcutta Garden, and now common everywhere about Calcutta in hedges. A shrub about 6 feet high, abounding in white bitter milk, known and used in America as ipecachuana : in umerous trials no proof was obtained of its efficacy ; this is probably the result of deterioration of properties through the influence of the climate of Bengal.—*O'Shaughnessy, p.* 566. This American plant, which is used in the West Indies as a substitute for ipecacuanha, is seen in cultivation occasionally, and in the neighborhood of Calcutta it is an abundant as a wild plant.—*Mason.*

(6151) PEEDOO MARUM.

Peedoo Marum, TAM. | Peemah wood, ENG.

A small tree wood used for building in Wynaad where it grows plentifully.

(6152) PEGANUM, from Πήγανον, the Greek name of Rue, of which three kinds are described by Dioscorides—the Garden, the Mountain, and he Wild. The last is said to be called Moly in Cappadocia and Galatia, and by some Harmala. t is remarkable that even in the present day a plant is found in the north of India, the Punjab, nd Cabul, which is called Hoormul by the naives of the above countries, and sometimes disinguished in India by the name of Lahooree-Hoormul, indicating that it was introduced from he direction of Lahore. The Persian works on Materia Medica in use in India give Molee as its Greek name, according to Dr. Royle (' Illustr.,' . 155). It is interesting to find that the plant o which these names are assigned by the natives f the country is the *Peganum Harmala* of botaists, a fact which shows that the investigations f the West had arrived at the same conclusion s those in the East respecting the plant alluded o by Grecian authors ; and this enables us to ut more faith in the results of such investigaons than is sometimes done. The plant, which called Syrian Rue in gardens, belongs to the atural family of *Rutaceæ*, and is of easy culture n any light soil. The seeds, which were formerly in use in medicine in Europe, still are so n the East, but are not possessed of any peculi- r or very active properties.—*Eng. Cyc.*

(6153) PEGANUM HARMALA, occurs in many parts of India, and is found in the Taj arden at Agra. The seeds are used in native medicine, and called Lahoree Hoormul. In the Mukzzunul-Udwieh," the seed is called *Moolie* ; he same as the Πήγανον, of Discorides. Royle, p. 55.—*O'Shaughnessy, p.* 260.

(6154) PEKEA, a genus of Plants inhabiting uyana, and furnishing the Saouari or Sawarra Nuts of the shops, a very different fruit from that to which the name of Saouari is given in Guyana. *Pekea* comprehends two species, the *P. butyrosa* and *P. tuberculosa* : the former is unknown in this country ; the latter, which yields the fruit in question, is a very large tree inhabiting the woods of Guyana, were it is called Tatayouba by the Garipou Indians. It has opposite digitate leaves, whose leaflets are oval, smooth on the upper side, but white with down beneath ; the terminal leaflet is said to be 8 inches long by 3½ inches in breadth, while those at the sides are much smaller. The flowers are unknown. The fruit consists of greenish compressed drupes, which adhere around a common centre, and contain a single seed of large size, covered with a brownish rugged woody shell, and containing a kernel of a soft consistence, and of the most delicate buttery quality. It is by far the best of the South American nuts that are brought to England, and much superior to English walnuts, almonds, and filberts ; but it is scarce and dear in most seasons.—*Eng. Cyc.*

(6855) PELARGONIUM is the name given by botanists to the gaily painted flowers which are usually called Geraniums in greenhouses. The latter differ obviously from *Pelargonium* in having regular flowers, and in being herbaceous plants, while the genus in question consists almost entirely of shrubs with flowers as irregular as those of the Pansy. There is a large number of genuine species of this genus, chiefly inhabiting the Cape of Good Hope ; and as these intermix very readily, producing in great abundance shrubs which are capable of being perpetuated by cuttings, a prodigious number of spurious species, as well as acknowledged varieties, have found their way into the writings of systematic botanists. For example, De Candolle enumerates 369 supposed species, of which at least one-half are of artificial origin. While however science has been embarrassed by this facility of cross-breeding, the gardens have been enriched by crowds of the most beautiful objects, in which the features of their savage progenitors can no longer be recognised ; and it is probable that of all the flowers which have been acted upon by the hand of man, the *Pelargonium* is that in which the result has been most striking. By care and attention to a few simple points of practice these plants may be cultivated and multiplied by any one who has a greenhouse, and hence they have become universal favourites. These points are the following, namely :—1, water ; 2, warmth ; 3, a gentle bottom heat ; 4, abundance of air ; 5, as much light as the leaves will bear ; and 6, a rich soil during the season of growth ; and a cool atmosphere, less water, abundance of light, and close pruning afterwards — *Eng. Cyc.* Many kinds of this genus, thrive well in India and are easily raised from seed, the Horse-shoe and Oak-leaf bear flowers abundantly, but it is generally remarked that plants grown from English seed do not blossom. Many of the species thrive well when put out in the garden, but are better for being grown in large pots, and if so placed, as only to receive the morning and evening sun, will blossom most abundantly.—*Riddell.*

(6156) PELAN. A very hard, fine, close-grained, heavy Ceylon wood.

(6157) PELECANIDÆ, a family of *Natatores*, or Swimming birds. The genus *Pelecanus* of Linnæus, placed in the 'Systema Naturæ' between *Diomedea* and *Plotus*, contains the True Pelicans (*Pelecanus Onotroculus*), the Frigate Bird or Man-of-War Bird (*Trachypetes*), under the designation of *P. aquilus*, the Cormorants (*P. Carbo* and *P. Graculus*), and the Solan Goose and Boobies.

Pelecanus (Linn.—Bill long, straight, wide, very much depressed; upper mandible flattened, terminated by a very strong hook or nail, which is compressed and very much bent; lower mandible formed by two osseous branches, which are depressed, flexible, and united at the point, and from which a naked skin in the form of a bag is suspended. The species of *Pelecanus* are widely spread (Europe, Asia, Africa, and America), though not numerous: two are European, P. *Onocrotalus*, and *P. Crispus*.

Phalacrocorax (Brisson).—Bill moderate or long, straight, compressed. This is the genus *Halieus* of Illiger, *Carbo* of Meyer, and *Hydrocorax* of Vieillot.—*Eng. Cyc.*

Pelecanus carbo, the Common Cormorant. (Old.) Under the throat a large white or whitish collar, the upper extremities of which reach to just below the eyes. The geographical distribution of this bird is very extensive. It is an inhabitant of the New as well as the Old Continent. In the latter it is widely diffused. It is spread over a considerable portion of Europe, especially the north. It is a common bird in England. Its voracity is indeed great, and the way in which it will dispose of a large fish, a place for instance, aided in a great measure by the powers of compression and dilatation conferred on it by the apparatus noticed above, is surprising. The species is easily domesticated. Montagu, who kept one, gives a favourable account of its disposition, and indeed their docility is shown by the use made of them formerly in fishing. Pennant cites Whitelock, who says that he had a cast of them manned like hawks, and which would come to hand.

(6158) *Phalacrocorax sinensis.* Sir George Staunton ('Embassy to China') states that the embassy, in its journey to Han-choo-foo, "had not proceeded far on the southern branch of the canal, when they arrived in the vicinity of the place where the Leu-tze, or famed Fishing-Bird of China (*Phalacrocorax Sinensis*) is bred, and instructed in the art and practice of supplying his owner with fish in great abundance. It is a species of the Pelican, resembling the Common Cormorant, but which, on a specimen being submitted to Dr. Shaw, he has distinguished in the following terms:—'Brown Pelican or Cormorant with white throat, the body whitish beneath and spotted with brown; the tail rounded; the irides blue; the bill yellow." The bird, an undoubted Cormorant, is figured in the 'Atlas,' pl. 37, and a vignette at the end of the chapter shows two Chinese fishermen carrying their light boat, around the gunnel of which their cormorants are perched, by a pole, resting on their shoulders between them. Sir George further says, "On a large lake close to this part of the canal, and to the eastward of it, are thousands of small boats and rafts, built entirely for this species of fishery. On each boat or raft are ten or a dozen birds, which at a signal from the owner plunge into the water; and it is astonishing to see the enormous size of fish with which they return grasped between their bills. They appeared to be so well trained that it did not require either ring or cord about their throats to prevent them from swallowing any portion of their prey, except what the master was pleased to return to them for encouragement and food. The boat used by these fishermen is of a remarkably light make, and is often carried to the lake, together with the fishing-birds by the men who are there to be supported by it.'

(6159) PELECANUS, CRISTATUS (Cormoran Largup of Temminck; Crested Corvorant of Pennant: Shag or green Cormorant of Gould) It is probable that *P. Desmarestii* is identical with *P. cristatus.* The habits of *P. cristatus* are very similar to those of *P. Carbo*

(6160) *Plotus* (Linn., Klein).—Bill longer than the head, quite, straight, firm though slender, obliquely dentilated on the edges, which are bent inwards, and terminating in a very sharp point This is the genus *Anhinga* of Brisson; *Plotu* of Scopoli; and *Ptinx* of Mœhr.

(6161) *Plotus Levaillantii* (*P. Africanu* of Swainson), It is found in Senegal, Cap of Good Hope, and part of the coast o Asia. (Lesson).

(6162) *Fregata* (Ray.) Feet short; the toe united by a membrane which is deeply notched This is the genus *Tachypetes* of Vieillot. The Man-of-War Birds, or Frigates, are eminently raptorial. Ray speaks of their eagle-eyes, vulturin claws, and kite-like glidings. Their immens extent of wing and dashing habits have obtaine for them the name of the swiftest sailing ship of war that sweep the seas.

(6763) *F, Aquilus.* Tail forked, body black, bi red, orbits black. The male is entirely black: abdomen of the female white. Some accounts stat the extent of the wings to be fourteen feet, a almost incredible expanse.

(6164) PELIJUREE. THALICTRUM. Root of Thalictrum foliolosum.—*Ben. Phar.*

(6165) PELLEVANDRUM (a blister) in Ganjam.

(6166) PELLITORY: PYRETHRUM. AKURKURA.

Akurkurra, ARAB.
Akkaraputta, CYNG.
Sesin. CHIN.
Pyrethre, FR.
Zahn, Wurtzel, GER.
Akulkurra or Akkurkurha, GUZ. HIND.
Pietro Parietaria, IT.
Akkarakarum, TAM.

Root of Anacylus (or Anthemis) Pyrethrum.—*Ben. Phar.* *Anthemis Pyrethrum*, is a native of the Levant, Barbary, Persia, and the South of Europe, cultivated for its root, which is used in medicine as a masticatory and a stimulant. The root is without smell, and when dry, it is some inches long, tough, fibrous, of the thickness of a quill, externally gray, internally white. Pellitory is to be found in most Indian bazars, it being an export from Mocha to Bombay.—*Faulkner.* Ainslie says, "this root is to be found in most of the Indian bazars though I cannot learn that the plant grows in this country, I am therefore inclined to think that the medicine is brought to these provinces from the more Northern parts of Africa where we know that it is produced. With regard to its Asiatic names there is this singularity that the Tamul, Arabic and Dukhanie appellations are nearly the same. The Vytianas prescribe an infusion of Akkaracarum in conjunction with the Lesser Galangal and Ginger as a cordial and stimulant in the lethargic stage of Typhus fever and in paralytic affections. They also use it as a masticatory for the tooth ache."—*Ains. Mat. Med. p.* 34.

(6167) PENANG LAWYER. The walking stick, so well known by this name, is a young plant of the Licuala acutifida, the *Plass tikooss*, of the Malays. It is a miniature palm, inhabiting Penang, and attaining generally only three or five feet, and in exceptional cases from fifteen to twenty feet in height. The "Penang lawyers" are prepared by scraping the young trunk with glass, so as to wholly remove the epidermis, and nothing more, the inside being the substance of rattan. It is on this account that the smaller thin, sticks are so much more sought after than the larger thicker ones, and are so rare. The stikes are ultimately straightened by fire, and then polished.—*Seeman.*

(6168) PENCILLARIA SPICATA: BAJREE: SPIKED MILLET. Holcus spicatus, Linn.

Kumbooloo, Sujilloo. TEL.
Bajra, HIND. and DUK.
Cumboo, TAM.
Bajari, GUZ.
Muttaree, MAL.
Cunghoo, SANS.

This grain is reckoned more delicate and of a less heating nature than Cholum: like it, it is made into cakes and porridge. Park, in his Travels in Africa informs us that the Natives of some parts of that country prepare from this grain a kind of Malt, which they use for making Beer.—*Ainslie, Vol.* II. *p.* 218.—*M. C. C.*

(6169) PENCILS.

Pinseelen, DUT.
Pinceaux, FR.
Pinsel, GER.
Pennelli, IT.
Pinceles, SP.

The instruments used by painters in laying on their colours. They are of various kinds and materials; some being formed of the bristles of the boar, and others of camel's hair, the down of swans, &c.—*McCulloch. Faulkner.*

(6170) PENERAPAH WOOD OR RED WOOD.

Muha Nambo, TEL.

(6171) PENKNIVES.

Canifs, FR.
Federmesser, GER.
Chakoo, Churree, GUZ. HIND.
Temperini, IT.
Kulm-trash, PERS.
Corta-plumas, SP.

Small knives used in making and mending pens. They are extensively manufactured in London, Sheffield, &c.

(6172) PENNYROYAL. MENTHA PULEGIUM. A mint used in cookery as seasoning and in distillation, propagated by division of the plant, like spearmint, requires a rich free soil, plenty of water and shade.—*Jaffrey.*

(6173) PENS.

Plumes a ecrire, FR.
Schreibferdren, GER.
Penne da scrivere, IT.
Kulm, GUZ. HIND. PERS.
Pera Stwoli, RUS.

Are well-known writing instruments, formed of the quills of the goose, swan, fowl, or some other bird. Metallic or steel pens, now extensively used, are manufactured in vast quantities at Birmingham, London, and Sheffield.—*Faulker.*

(6174) PENS, Reed for writing Persian with.

Perin Nanil, TAM.
Beroo. DUK.
Pedda Relloo, TEL.
Burro, Kulm, GUZ. HIND. and PERS.
Ains. Mat. Med. p. 194.

The Reed pens used by all mahomedans in writing the Arabic or Persian character, are the product of the Saccharum Sara. This species of thin hollow jointed reed, is used in Eastern countries for writing with. Persian reeds or pens are most esteemed, being tougher and capable of being used much longer than the Indian reed. The Arundo karka, Linn. is also similarly used in Scinde.

(6175) PENSTEMON. SCROPHULARINEÆ.—Penstemon Digitalis.—They are herbaceous plants, and are cultivated as the Chelone, they are of every variety of colour.—*Riddell.*

(6176) PENTADESMIS, a genus of plants belonging to the natural order *Clusiaceæ*. P.

Butyracea is a tree found in Sierra Leone, from which a fatty substance is obtained, which has given rise to its name of the Butter-Tree and Tallow-Tree. It has an ovate fleshy fruit, about as large as a citron, and its stamens are collected, into five parcels, whence its botanical name.—*Eng. Cyc.*

(6177) PENTAPTERA ARJUNA.

Urjoona or Urjoon-sadra, DUK.

This tree, like the former, is a common jungle tree, the bark is used internally by the natives as a tonic and is also applied externally as a vulnerary.—*Riddell.*

(6178) PENTAPTERA ARJUNA AND P. GLABRA.

Touk-kyau, BURM.

This is also a valuable timber, found growing in all the Teak Forests; it consists of two kinds, both of equal value. The timber is as strong as Teak and usually attains a girth of from seven to nine feet, with height in still more lofty proportion. This timber has never, I believe, been fairly tried for ship-building. Dark-brown wood. —*McClelland.*

(6179) PENTAPTERA CORIACEA.

Arremuti Marum, TAM.

A tree of considerable size. Native of the mountains of Coromandel, chiefly those of the western parts, the bark is very thick and deeply cracked, outwardly of a dark gray colour.—*RhodeM. S.S.*

(6180) PENTAPTERA GLABRA, TELLA MUTHIE WOOD.

Tella muddi kurra, Vel maroodum.
See P. Arjuna.

(6181) PENTAPTERA TOMENTOSA, COMBRETACEÆ. Nulla muthee wood.

Nulla Muddee, TEL.
Carroo Maruda, TAM.
Madi, CAN.
Aans BENG,
Peeasal or Usan, DUK.

A large jungle tree with thick leathery leaves; fruit smooth, five winged; the fibre of the wood is very tough, and used for making shafts to gigs, &c. Found in various parts of India: grows to be a large timber tree of much utility, Flowering time April and May; the seed ripens in the cool season. I have found this timber in use only in the Rajahmundry circar it is very hard and heavy and not so stiff as teak.—*Rohde M.S.S.*

(6182) PENTAPETES PHŒNICEA, BYTTNERIACEÆ. An erect growing plant; flowers axillary, large, of a beautiful bright red colour, appear during the rains.—*Riddell.*

(6183) PEPPER. The black pepper of commerce is obtained from the dried unripe fruit (drupes) of *Piper nigrum*, a climbing plant common in the East Indies, and of the simplest culture, being multiplied with facility by cuttings or suckers. The ripe fruit, when deprived of its outer fleshy covering by washing, forms the white pepper of the shops. The dried fruiting spikes of *P. longum*, a perennial shrub, native of Malabar and Bengal, constitute long pepper. The fruit of *Xylopia aromatica* is commonly called Ethiopian pepper, from being used as pepper in Africa. The seeds of some species of fennel-flowers (*Nigella sativa* and *arvensis*), natives of the south of Europe, were formerly used instead of pepper, and are said to be still extensively employed in adulterating it. In Japan, the capsules of *Xanthoxylum piperitum*, or *Fagara Piperita*, are used as a substitute for pepper, and so is the fruit of *Tasmania aromatica* in Van Diemen's Land. According to Dr. Roxburgh, *P. trioium* is cultivated in the East, and yields an excellent pepper.

The pepper vine rises about two feet in the first year of its growth, and attains to nearly six feet in the second, at which time, if vigorous and healthy, the petals begin to form the corolla or blossom. All suckers and side shoots are to be carefully removed, and the vines should be thinned or pruned, if they become bushy at the top. Rank coarse weeds and parasitical plants should be uprooted. The vine would climb, if permitted, to the elevation of twenty feet, but is said to bear best when kept down to the height of ten or twelve feet. It produces two crops in the year. The fruit grows abundantly from all the branches, in long small clusters of from 20 to 50 grains; when ripe it is of a bright red colour. After being gathered, it is spread on mats in the sun to dry, when it becomes black and shrivelled. The grains are separated from the stalks by hand rubbing. The roots and thickest parts of the stems when cut into small pieces and dried, form a considerable article of commerce all over India, under the name of *Pippulamoola*. Almost all the plants of the family *Piperaceæ*, have a strong aromatic smell and a sharp burning taste. This small group of plants is confined to the hottest regions of the globe; being most abundant in tropical America and in the East Indian Archipelago, but more so in the equinoctial regions of Africa.

The common black pepper, *P. nigrum*, represents the usual property of the order, which is not confined to the fruit, but pervades, more or less, the whole plant. It is peculiar to the torrid zone of Asia, and appears to be indigenous to the coast of Malabar, where it has been found in a wild state. From this it extends between the meridians of longitude 96 deg. and 116 deg. S. and the parallels of latitude 5 deg. S. and 12 deg. N., beyond which no pepper is found. Within these limits are the islands of Sumatra and Borneo, with the Malay peninsula and part of Siam. Sumatra produces by far the greatest quantity of pepper. In 1842, the annual produce of this island was reckoned at 30,000,000, lbs., being more than the amount furnished by all the other pepper districts in the world. A little pepper is grown in the Mauritius and the west India Islands, and its cultivation is making some progress on the Western Coast of Africa, as England imported from thence 2,9 9 bags and casks in 1846, and about 110,000 lbs. in 1847. Mr. J. Crawfurd, F.R.S., one of the best authorities on all that relates to the commerce and agriculture of the Eastern Archipelago, recently estimated the produce of pepper as follows :—

Sumatra (West Coast),	lbs.	20,000,000
,, (East Coast)		8,000,000
Islands in the Straits of Malacca,		3,600,000
Malay Peninsula,		3.733,333
Borneo,		2,666,667
Siam,		8,000,000
Malabar,		4.060,000
Total.		50,000,000
If we add to this,		
Western Coast of Africa and B. W. Indies,		53,000
Java,		4,000,000
Mauritius and Ceylon,		80,000
It gives		54,133,000

As the total produce of the world.

Black pepper constitutes a great and valuable article of export from the Indian Islands; which, as we have seen, afford by far the argest portion of what is consumed throughout the world In the first intercourse of the Dutch and English with India, it constituted the most considerable and important staple of their commerce. The production of pepper is confined in a great measure to the western countries of the Eastern Archipelago, and among these to the slands in the centre and to the northern quarter, ncluding the Peninsula. It is obtained in the ports on both sides of the coast of the latter, but particularly the north-eastern coast. The principal quarters (according to Mr. Crawfurd,) re Patani, Tringanu, and Kalantin. In the Straits a large quantity is produced in the sland of Singapore, and above all in Pinang, where the capital of Europeans and he skill and industry of the Chinese have een successfully applied to its culture. The western extremity of Sumatra, and the north-west coast of that island, are the most remarkable situations in it for the production of pepper, nd here we have Acheen, Tikao, Bencoolen, Padang, and the country of the Lampungs. The roduction of the eastern extremity of Sumatra r Palembang is considerable, but held of inferior uality. In the fertile island of Java, the quantity of pepper grown is inconsiderable, nor is it remarkable for the goodness of its quality. The rovince of Bantam has always furnished, nd still continues to produce, the most pepper : ut the culture of this creeper is fast giving place n Java to staples affording higher profits and requiring less care. The exports were, in the following years —

	piculs.		lbs.
1830 ……	6,061	1843 ……	3,737,732
1835 ……	11,868	1848 ……	461,680
1839 ……	11,044	1851 ……	95,037
1841 ……	13,477	1852 ……	135,690

The number of pepper vines in the district of Bencoolen, in the close of the year 1852, was as follows:—1,571,894 young vines; 2,437,052 bearing ditto; total, 4,008,946. Up to the end of September there had been delivered to the Government 1,145 piculs white pepper, and 1,128 piculs black pepper, while of the harvest of 1852 there were still probably to be received 330 piculs white, and 4,967 piculs black pepper. The south, the west, and the north coasts of the great island of Borneo produce a large quantity of pepper; as early as 1721 it was a staple commodity of this island. Banjarmassin is the most productive place on the south coast, and the State of Borneo Proper on the north coast. The best pepper certainly does not grow in the richest soils, for the peppers of Java and Palembang are the worst of the Archipelago, and that of Pinang and the west coast of Sumatra are the best. Care in culture and curing improves the quality, as with other articles, and for this reason chiefly it is that the pepper of Pinang is more in esteem than that of any other portion of the Archipelago. From the ports and districts of Siam 3,500 to 4,000 tons are exported annually. The duty at present levied on pepper in England is 6d. per lb., while the wholesale price for that of Pinang, Malabar, and Sumatra is about 4d. per lb. White pepper ranges from 9d. to 1s. 6d. per lb. The prime cost in Singapore is not more than 1½d. per lb. About 70,000 or 80,000 piculs of pepper are annually exported from Singapore, of which between 30,000 and 40,000 piculs have, until within the last two years, gone on to Great Britain. More than one-half of the pepper exported from Singapore is grown in the island by Chinese settlers. The low selling price of the article in the English market, the high duty levied upon it, and the large freight paid for its carriage to Great Britain, now leave so small a price to the cultivator in Singapore, that the cultivation ceases to be remunerative, and is carried on at a loss ; and has consequently within the last year or two begun to decrease rapidly, involving the Chinese growers, who are generally of the poorest class, and without capital, in great distress. A reduction in the duty on pepper has always been followed by a very large increase in the consumption of the article, as will appear from the following table, showing the importation and consumption in Great Britain during some of the first and last years of the different rates of duty :—

		Duty		Singapore price.				
Year.	Quantity consumed.	s.	d.	s.	d.		s.	d.
1811	... 1,457,383 ...	1	10½ ..	0	7½	to	0	7¾
1814	... 941,569 ...	1	10½ ..	0	11	,,	1	1
1820	... 1,404,021 ...	2	6 ..	0	6½	,,	0	6¾
1824	... 1,447,030 ...	2	6 ..	0	4¾	,,	0	5½
1826	... 2,529,027 ...	1	0 ..	0	4	,,	0	4½
1836	... 2,749,491 ...	1	0 ..	0	0	,,	0	0
1837	... 2,625,075 ...	0	6 ..	0	0	,,	0	0
1845	... 3,210,415 ...	0	6 ..	0	2¼	,,	0	4¾

In a memorial from the mercantile community of Singapore, sent home in 1848, it is asserted that a reduction in the duty of pepper being always attended by a large increase in the consumption, would not lead to any serious loss in the revenue, while it would confer a great boon on the poorer classes, to whom it has now become a necessary article of life. The reduction would also be of great advantage to British manufacturers, as well as to our Indian possessions, by giving rise to an increased demand for British goods and productions, and of the highest benefit to the agricultural settlers in the island of Singapore, by enabling them to procure for their labor an honest means of livelihood. The pepper vines, which are allowed to climb poles or small trees, are tolerably productive at Singapore; and pepper planting is esteemed by the Chinese to be a profitable speculation, particularly if they are enabled to evade the payment of quit-rent. An acre of pepper vines will yield 1,161 lbs. of clean pepper. In Sumatra a full grown plant has been known to produce seven pounds; in Pinang the yield is much more. The average produce of one thousand vines is said, however, to be only about 450 lbs. Colonel Low, in his "Dissertation on Pinang," published at Singapore some years ago, gives an interesting account of the culture:—"Pepper was, during many years, the staple product of Pinang soil, the average annual quantity having been nearly four millions of pounds; but previous to the year 1810, the above amount had decreased to about two-and-a-half millions of pounds, which was the result of the continental system. The price having fallen at length to three and three-and-a-half dollars the picul—with only a few occasional exceptions of rises—the cultivation of this spice was gradually abandoned, and the total product at this day does not exceed 2,000 piculs. The original cost, when pepper was at a high price, together with charges of transporting it to Europe, amounted to £36,357 for every five hundred tons, and the loss by wastage was estimated at £5,405. In 1818 there remained on the island 1,480,265 pepper vines in bearing, and the average value of exports of pepper, from Pinang, including that received from other places was averaged at 106,870 Spanish dollars. As might have been foreseen, the fall of prices has so greatly diminished the cultivation of pepper to the eastward, that a reaction is likely to take place; and has in fact partly shown itself already. Some Chinese in Pinang and Province Wellesley seem to be preparing to renew the cultivation. There is abundant scope for the purposes on both sides of the harbour, and every facility is at hand for carrying it on. The pepper plant or vine requires a good soil, the richer the better, but the *red* soil of the higher hills is not congenial, the Chinese think, to it. The undulations skirting the bases of the hills, and the deep alluvial lands, where not saturated with water, or liable to be overflowed, are preferred. The Chinese have always been the chief cultivators, and when the speculation flourished they received advances from the merchants, which they paid back in produce at fixed rates. When pepper was extensively cultivated on Prince of Wales Island, the European owner of the land had the forest cleared by contract, and the vines planted by contract, and when the vines came into bearing the plantation was farmed to the Chinese from year to year, on payment of a specific quantity of pepper. Any other plan would have ruined the capitalist, as the culture is almost entirely in their hands in the Straits' Settlements, and they will not work so well for others as when they are specially interested. The Plants are set out at intervals, *every way*, of from seven to twelve feet, according to the degree of fertility of the soil, so that there are from 8 0 to 1,000 vines in one orlong of land; to each vine is allotted a prop of from ten to thirteen feet high, cut from the thorny tree called *dadap*, or where that is scarce, from the less durable *boonglai*; these props take root, thus affording both shade and support to the plant. The plant may be raised from seed pepper, but the plan is not approved of, cuttings being preferable, as they soonest come into bearing. The pits in which these cuttings are set should be a foot-and-a-half square, and two feet in depth; manure is not often applied, and then it is only some turf ashes. However unpicturesque a pepper plantation may be, still its neat and uniform appearance renders the landscape lively, and there can be little doubt that the island has suffered in its salubrity since the jungle usurped the extensive tracts formerly under pepper cultivation. When the vine has reached the height of three or four feet, it is bent down and laid in the earth, and about five of the strongest shoots which now spring up are retained and carefully trained up the prop, to which they are tied by means of ligatures of some creeping plants. One Chinese, after the plantation has been farmed, can take care of two orlongs of land. Th usual mode is this:—an advance is made by th capitalist to the labourer for building a house, an for agricultural implements; he then receives tw dollars monthly to subsist on, until the end of the third year, when the estate or plantation i equally divided betwixt the contracting parties. The Chinese and even European cultivators use.

ormerly to engage the Chinese who had just
rrived from China; they paid off their passage-
oney, and then allowed them two dollars
onthly, for provisions, for one year, with a suit
f clothes, by which means the cost of the labor
f one man averaged about three dollars monthly;
ut this plan is attended with risks. The cost
ttendant on the cultivation of two orlongs of
nd, with pepper, for three years—the Chinese
borer receiving the usual hire of *five* Spanish
ollars monthly—will be nearly as follows:—

	Spanish dollars.
rice of land, clearing, and planting.........	40
nit rent, at 75 cents per annum per orlong	9
wo thousand plants........	4
„ dadap props.	6
nplements..	6
ouse	10
abor..................................	200
nterest, loosely calculated at	30
Total Spanish dollars......	305

In a very good soil a pepper vine will yield
out one-eight of a pound of dry produce at the
d of the first year; at the end of the second,
out a quarter of a pound; and at the expira-
on of the third, probably one pound; at the end
the fourth, from three to three-and-half pounds;
tto fifth, from eight to ten pounds. After
e fifth year up to the fifteenth, or even the
entieth year, about ten pounds of dry merchan-
ble produce may be obtained from each vine,
der favourable circumstances. The Chinese
eculator used to rent out his half-share of a
w plantation for five years, to his cultivating
rtner, after the expiration of the first three
ars, at the rate of thirty piculs per annum; the
tal produce of these five years giving about
ty-six piculs annually as an average. A pepper
antation never survives the thirtieth year, un-
ss in extremely rich soil, and then it is unpro-
ctive; nor will the young vine thrive on an
d worn out pepper land, a peculiarity which is
plicable to the coffee tree. The chief crop
sts from August to February. Four pounds
dry produce, for ten of green, is considered a
ir estimate. Great care is requisite in the
anagement of the vine, and especially in training
d tying it on the props. It is subject to be
jured by the attacks of a small insect. The
een pepper dries in two or three days, and if it
intended that it shall be black, it is pulled
fore it is quite ripe. To make white pepper,
e berry is allowed to remain somewhat longer
the vine; it is, when plucked, immersed in
iling water, by means of which process and
bsequent friction, before drying, the husk is
parated. The exports of pepper from Pinang in
ar years have been -In 1849, 2,591,233 lbs.;
1850, 6,397,733 lbs.; in 1851, 2,366,933
s.; in 1852, 2,112,133 lbs." A small quantity of pepper seems to be annually exported from Ceylon, which is presumed to be the growth of that islands; thus there were:—

54	cwts. shipped in	1842
83	„ „	1843
102	„ „	1844

In the Customs returns of Ceylon, it is classed with cardamoms, and 160 to 170 cwt. of the two were shipped in each of the years 1850 and 1851. In 1852, the quantity was smaller. Pepper cultivation has been introduced into the Mauritius, and in 1839 more than 500,000 lbs. were imported from thence, but as the shipments have since decreased, it has, it is is presumed, given place to the more profitable staple sugar.—*Simmonds, p.* 428. The natural family piperaceæ includes four plants of great utility to mankind. Two of these, Piper nigrum or black pepper and Piper longum more recently named Chavica Roxburghii or long pepper are chiefly used for dietetic and culinary purposes while others piper Cubeba now Cubeba Officinalis and Artanthe elongata or the matico plum are principally employed in medicine. The plant which yields cayenne, Capsicum annuum, often improperly termed cayenne pepper does not belong to the family of Piperaceæ at all but to that of Solenaceæ. The pepper of commerce is furnished by Piper nigrum, and it is to this species, therefore, that on the present occasion we shall have to direct attention. The black pepper plant grows both in the East and West Indies, in Sumatra, Java, and other islands, it is a shrubby, climbing plant, which attains the height of from eight to twelve feet. The berries, or peppercorns, grow on terminal flowers-stalks or spadices. They are at first green, but change subsequently to red and then to black. When any of the berries on a spadix have begun to turn red, the whole are gathered, dried in the sun, and the stalks separated by the hand. In drying, the succulent part of each berry becomes contracted and wrinkled, forming a hardened wrinkled cortex, the corrugations being much raised, and describing a kind of elevated network. The following more detailed particulars concerning the growth of the pepper plant and the gathering of the berries are extracted from M'Culloch's "Dictionary of Commerce." "It climbs to the height of twenty feet but is said to bear best when restrained, to the height of twelve feet. It begins to produce at about the third year, and is in perfection at the seventh; continues in this state for three or four years, and declines for about as many more, until it ceases to be worth keeping. The fruit grows abundantly from all its branches, in long, small clusters of from twenty to fifty grains. When ripe it is of a bright red color. After being gathered it is spread on mats in the sun, when it loses its red color and becomes black and shrivelled as we see it. The grains are separated from the stalks by hand-rubbing. That which has been gathered at the proper period shrivels the best but if plucked too soon, it will become broken and dusty in its removal from place to place. The vine produces two crops in the year but the seasons are subject to great irregularities. Those berries are the best which are not too small nor too much corrugated, which are heavy and sink readily in water. The two varieties of pepper known as "black" and "white" pepper are both obtained from the same plant: black ground pepper is the entire berry reduced to powder, while the white consists of the same berry, decorticated or deprived of its outer and black husk or covering. We learn from Pereira that three kinds of black pepper are distinguished by wholesale dealers. These are:—"Malabar pepper.—This is the most valuable it is brownish-black free from stalks and nearly free from dust." "Penang pepper. This is brownish-black larger, smoother, free from stalks, but very dusty. It is sometimes used in England to manufacture white pepper." "Sumatra Pepper. This is the cheapest sort; it is black mixed with stalks and contains much dust. Under the name of Sumatra pepper, some dealers include the Penang or brownish-black sort, and the black Sumatra sort. Three kinds or varieties of white pepper have also been distinguished. "Tellicherry pepper, which is of two kinds: large fine Tellicherry pepper is larger and whiter than any other description of white pepper, and fetches a higher price; small or coriander-like pepper is shrivelled." Common white pepper comes from Penang by Singapore, it is round, and not shrivelled, its value depends on its size and whiteness." "English bleached or White pepper. When the two preceding sorts are scarce, brown, Penang pepper is bleached. The yellowest and largest are chosen for this purpose for neither an expensive nor small sort would pay."

Structure of the Berry. The berry of the black pepper plant possesses a structure of considerable complication and of much interest and since without an accurate knowledge of its minute orginisation we cannot hope to be in a position to detect the numerous adulterations to which this article is subject, it becomes necessary to describe somewhat minutely the tissues which enter into its formation. In a section of the berry, two parts are to be distinguished an outer and an inner, the first is black or reddish black; and the second more or less, white, hard and brittle, except in the centre of the seed where it is frequently soft and pulverulent. The active properties of black pepper depend upon an acrid resin, a volatile oil, and a crystallisable substance called piperine, which exists also in long pepper, and in cubebs. The resin is situated chiefly in the outer part of the cortex, the volatile oil in the inner part or fourth layer, and the piperine in the yellow cells of the seed itself. It has long been notorious that pepper is one of those articles most liable to adulteration, notwithstanding which fact and the importance of the subject in a fiscal point of view, but little has hitherto been effected in bringing to light the nature of the sophistications practised, and more particularly in describing the methods of their detections. Of statements indeed we have several but of either proofs or directions scarcely any worthy of notice or entitled to confidence. In support of these assertions, we proceed to make reference to the more important as well as recent authorities on the subject of the adulteration of food. Thus in the "Supplement" to Dr. Ure's "Dictionary of Arts, Manufactures and Mines," we do not meet with any information respecting the adulteration of pepper worth quoting. In M'Culloch's "Commercial Dictionary" we observe the solitary remark, "Black pepper, sold ground is said to be adulterated with burnt crust of bread." In Mitchell's "Treatise on the Falsification of food" we find the following observations. "In the state of powder pepper is nearly always adulterated; substances being sold for the express purpose. It is often mixed with powdered husks of mustard, which are openly sold for this purpose, as is also the sweeping from the pepper warehouses under the name of P. D. or Pepper dust; and yet an inferior kind of these adulterations is sold under the name of D. P. D. signifying the dust or dirt of pepper dust." No directions, be it observed, are given for the detection of the adulterations referred to in the above quotation. Normandy, in his "Commercial Handbook of Chemical Analysis," remarks, "Both black and white pepper, when ground, are very often adulterated, and sometimes in an extraordinary degree, with ground oil-cake, linseed-meal, and other like substances. The best way of providing against adulteration is, like that for coffee, to buy the article in the grain, and to examine whether it has the appearance which we have described above, and which is the criterion of a good quality," and in a subsequent paragraph he writes. "For the purpose of ascertaining whether ground pepper is genuine and of good quality, the best way consists in ascertaining the amount of piperine contained in the pepper under examination." Thus here, again no instructions are given, by which the nature of the adulterations practised in each case may be determined, but we are recommended to ascertain the amount of piperine present, and which, when known, tells us nothing about the adulterations of the article, but simply indicates quality a pepper may be either good or bad, and accordingly contain much or little piperin, and yet be perfectly "genuine." Although the work of Mr. Normandy was published in the year 1850 not a syllable is said about the application of the mecroscope to the detection of the adulterations of pepper. The last authority to whom we shall refer is Pereira who in the description of piper nigrum as contained in the new edition of his "Materia Medica" and under the head adulteration writes "Sago is said to have been used to adulterate ground white pepper. The microscope would readily detect the fraud the starch grains of sago, being very much larger than those of pepper from which they also differ in shape. The above paragraph comprises the whole that is said by Dr. Pereira, on the adulteration of pepper. We have now to state that by means of the microscope applied to the elucidation of structural botany we have succeeded in detecting in the most satisfactory and conclusive manner the adulteration of pepper by not less than five different substances namely linseed, mustard-seed wheat-flour pea-flour and ground rice. On Factitions Pepper berries. Some years since it was not uncommon to meet with artificial pepper corns instances of their occurence are mentioned in "Thompson's Annals of Chemistry and also by Accum in the second edition of his celebrated Death in the pot. Thus Accum writes I have examined large packages of both black and white pepper by order of the Excise and have found them to contain about sixteen per cent of this artificial compound. This purious pepper is made of Oil cake (the esidue of the linseed from which the oil has een pressed, common clay and a portion of ayenne pepper formed into a mass and granulaed being first pressed through a seive and then olled in a cask. The period during which his fraud prevailed was probably confined to he time, which expired in 1823, when the luty amounted to no less than 2s. 6d. on a single ound of pepper. It appears. First, that more han half of the peppers purchased previous to he recent convictions were adulterated. Second, hat a much less, although still a considerable roportion of the samples procured subsequent to hose convictions were likewise adulterated. The resent duty on pepper is 6d per pound, and 5 er cent, thereon, which yielded, for the year 850, no less than £85,526 8s. 1d. We thus erceive how great is the interest of the Government to prevent the adulteration of this article, y which thousands are lost to the Exchequer nnually. The sum of £85,526 8s. reduced o sixpences, gives the number of pounds onsumed in the year 1850 viz., 1,710,536 ounds. Mr. Culloch estimates the quantity of epper retained for consumption in the year 1842 t 2,679,624 pounds and the income derived rom the duty at only £70,348 3s. 4d. These wo statements it is impossible to reconcile, for, correct upwards of 1,000,000 pounds must ave escaped the duty altogether. There ere entered for home consumption, in the ear 1852, 3,524,502 lbs; in 1853, 3,461,333 lbs: and in the first six months of 1854, 1,656,721 lbs. We believe, that were the duty on pepper still further reduced, the revenue would be found to suffer scarcely at all, and that the increased consumption and lessened inducement to adulteration which would exist, would cause the sum fully to equal, if it did not exceed, the present amount.—*Food and its Adulterations, p.* 42. Pepper is a regular crop on the Western Coast, of India in, Coorg, Mysore, Canara and Travancore.

The following varieties were examined.

Black Pepper.	Long, Pepper.
White Pepper,	Cubebs.

The two first are the same substance, but the white pepper is less pungent than the black, from which the wrinkled covering has been removed by bleaching, which improves the colour, but deteriorates the quality. The quantity of black pepper exported is immense, that of Malabar is the best.—*M. E. J. R.*

BLACK PEPPER EXPORTED FROM SINGAPORE.

		Piculs.	Value in rupees.
1841	Total Exports	66,810	
,,	Growth of Singapore	21,231	47,674
1842	Exports	74.228	
,,	Growth of Singapore	32,277	72,473
1843	Exports	57,883	
,,	Growth of Singapore	35,585	79,900
1844	Exports	67,148	
,,	Growth of Singapore	42,995	386,152
1845	Exports	65 892	
,,	Growth of Singapore	39,019	350,443
1846	Exports	56 709	
,,	Growth of Singapore	35,712	——
1847	Exports	60,994	
,,	Growth of Singapore	36,565	328,397

Pliny, the naturalist, states that the price of pepper in the market of Rome in his time was, in English money, 9s. 4d. a pound, and thus we have the price of pepper at least 1,774 years ago. The pepper alluded to must have been the produce of Malabar, the nearest part of India to Europe that produced the article, and its prime cost could not have exceeded the present one, or about 2d. a pound. It would most probably have come to Europe by crossing the Indian and Arabian oceans, with the easterly monsoon, sailing up the Red Sea, crossing the desert, dropping down the Nile, and making its way along the Mediterranean by two-thirds of its whole length. This voyage, which in our times can be performed in a month, most probably then took eighteen. Transit and customs duties must have been paid over and over again, and there must have been plenty of extortion. All this will explain how pepper could not be sold in the Roman market under fifty-six times its prime cost. Immediately previous to the discovery of the route to India by the Cape of Good Hope, we find that the price of pepper in the markets of Europe had fallen to 6s. a pound, or 3s. 4d. less than in the time of Pliny. What probably contributed to this fall, was the superior skill in navigation of the now converted Arabs, and the extension of their commerce to the islands of the Eastern Archipelago, which abounded in pepper. After the great discovery of Vasco de Gama, the price of pepper fell to about 1s. 3d. a pound, a fall of 8s. 1d. from that of the time of Pliny, and of 4s 9d. from that of the Mahommedan Arabs, Turks, and Venetians.

In 1826, 14,000,000 lbs. of pepper were imported into the United Kingdom, of which about 6,500,000 were re-exported. In 1841, 15,000,000 lbs. were imported, of which 6,500,000 where reshipped to other countries. The home consumption, it will be seen, nowraveages about 3,250,000 lbs :—

	Imports. lbs.	Home consumption. lbs.
1845	......9,852,984......	3,209,718
1846	......5,906,586.....	3,299,955
1847	......4,669,930	2,966,022
1848	......8,125,545......	3,185,337
1849	......4,796,042......	3,257,911
1850	......8,028,319......	3,170,883
1851	... .3,996,496......	3,303,403
1852	......6,641,699......	3,524,501

The following return shows the number of bags of pepper imported into the United Kingdom, with the quautity retained for home consumption :—

	Imports.		Retained for home consumption.	
	Black. bags.	White. bags.	Black. bags.	White. bags.
1843	... 37,840	... 3,861	... 21,163	... 2,257
1844	... 60,705	... 2,123	... 23,525	... 2,122
1845	... 80,600	... 3,208	... 30,294	... 2,861
1847	... 37,194	... 1,236	... 28,768	... 2,654
1848	... 65,518	... 3,042	... 31,665	... 2,950
1849	... 43,651	... 2,616	... 32,246	... 3,859

—*Simmonds.*

(6184) PEPPER, LONG. CHAVICA Roxburghii.

Dar-Filfil. ARAB.
Tipili. CYNG.
Poivre long FR.
Lange Pfeffer, GER.
Pepeelce GUZ. HIND.
Pippali, Krishna SANS.
Pimenta larga, SP.
Pepe lungo, IT.
Chabi jawa, JAV,
Piper Longum, LAT.
Tabee MAL,
Filfill-i-daraz. PERS.
Tipili, TAM.
Pipuloo, TEL.
Pipel. DUK.

This species of pepper is the produce of a perennial plant (*Piper longum*), a native of Bengal, Siam &c. The fruit is hottest in its immature state, and is therefore gathered whilst green, and dried in the sun. It is met with in entire spikes about an inch long, possessing a darkish brown, or gray colour. It has a weak aromatic odour, an intensely fiery, and pungent taste, and its properties correspond closely with those of black pepper.—*Faulkner.*

(6185) PEPPER ROOT.

Filfel-Mooch, ARAB.
Pepeelee-Mool, GUZ. and HIND.
Granthika, Pippali Mul
SANS.
Tipili moolum, TAM.

The root of the long-pepper is a favourit medicine of the Hindoos ; it possess the virtue of the berry, but in a weaker degree, and i prescribed by them in cases of palsy, tetanu and apoplexy. The long pepper is produced i abundance in many parts of Upper, as well a Lower Hindoostan.—*Ainslie.* Pepper root is pro curable in most Indian bazars.

(6186) PEPPER, WILD. Fillil burree. th fruits of several species of Vitex.—*Ben. Ph.* 23

(6187) PEPPERMINT. MENTHA PIPERIT. An aromatic herb, raised from seed. This plan might be grown for distillation on the hills, an become a valuable article of commerce : grow freely on the plains. *Jaffrey.*

(6188) PERCIDÆ, or *Percoides* of Cuvie a family of Acanthopterygious Fishes, of whic the Common Perch may be regarded as the typ They have the body covered with scales whos outer surface is more or less rough, and the fr margins of which are denticulated. The fles of these fishes is generally well-flavoured an wholesome. They inhabit both salt and fres water. The first division of the Percoides, ac cording to Cuvier, comprises all those speci which have the ventral fins placed under the pe torals, five soft rays to the pectoral fins, sev branchiostegous rays, and two dorsal fins. Th section includes the following genera :—

(6189) *Perca* proper, in which the pre-ope culum is denticulated ; the operculum is produce be- hind into a flattened spine ; the infraorbita are obscurely denticulated, and the tongue i smooth. The Common Perch (*Perca fluviatilis* Linnæus) is the best example. It is a common fis in the fresh-waters of Great Britain. Close allied to this is the *P. Italica* of Cuvier and V lenciennes, a species found in tolerable abu dance in some parts of Italy ; it differs from t *Perca fluviatilis* in being of a shorter and deep form, and is destitute of the black bands. Sev ral true perches are found in North America species have also been discovered in Java an New Zealand : it is highly probable therefor from the extensive geographical range of t Perches proper thus exhibited, that very ma species still remain to be discovered.

(6190) *Labrax* (Cuv. and Val.) differs chief from the true Perches in having the infra orbita destitute of denticulations as well as the subope culum ; the operculum (which, as well as t preoperculum, is entirely covered with scales) h two spines on the posterior part, and the tongu is furnished with minute teeth. [LABRAX.]

(6191) *Lates* (Cuv. and Val.), a genus als closely allied to *Perca* proper, in fact differs onl in having the infra orbitals more deeply dentic lated as well as the humerals; large spines are observable on the angle of the preoperculum; the anterior dorsal is shorter and higher than in the Perch; the tongue is smooth, as in the last-mentioned fish. The fishes of this sub-genus are usually of large size, good eating, and are chiefly found in the rivers in the warmer parts of he Old World.

4. *Centropomus* (Lacep.).

5. *Lucioperca* (Cuv and Val.).

6. *Huro* (Cuv. and Val.).

7. *Etelis* (Cuv. and. Val.)—Only one species f *Etelis* is known; its body is elongated, the nuzzle is rather obtuse, the eyes very large, and he outer rays of the tail-fin are elongated. This ish (the *E. carbunculus*, Cuv. and Val.) is emarkable for its brilliant red colour, and is dorned with longitudinal golden stripes. It is ound in the region of the Seychelle Islands, orth of Madagascar.

8. *Niphon* (Cuv. and Val.).

9. *Enoplosus* (Lacepede).

10. *Diploprion* (Kuhl and Van Hasselt), like he two preceding genera, contains but one speies (*Diploprion bifasciatum* of the authors just uoted). It is found off the coast of Java.

11. *Apogon* (Lacepede).

12. *Cheilodipterus* (Lacepede).

13. *Pomatomus* (Cuv. and Val.).—Only one pecies of this genus is known, the *Pomatomus lescopium* of Risso, and this is said to be exceedngly rare, living, it appears, in very deep water.

14. *Ambassis* (Cuv. and Val.).—In the form f the body it approaches the common perch. It the *A. Commersonii* (Cuv and Val.): a second pecies is found off the Malabar coast, and there e several in the Indian seas, most of which are escribed by Hamilton in his 'Account of the ishes found in the River Ganges and its Branch-,' under the generic name *Chanda*.

15. *Aspro* (Cuv. and Val.).

16. *Grammistes* (Cuv. and Val.)—The *G. oritalis* (Cuv. and Val.) is of a small size; its coar is deep brown, and the head and body are lorned with numerous longitudinal white lines; e number of these lines, it would appear, vaes in different individuals. It inhabits the Inan seas.

The second division comprises those species which the first or spinous dorsal is unil with the second or soft-rayed dorsal, so to form one continuous fin, and is composed iefly of the great genus *Skeranus*. The ird division embraces those Percoid Fishes ich differ from the preceding in having less an seven branchiostegous rays.

1. *Myripristis* (Cuv. and Val.).

2. *Holocentrum* (Cuv. and Val.).

3. *Beryx* (Cuv. and Val.).

In the fifth division of Percoid Fishes the ntral fins are placed in advance of the pectorals. contains the genera *Trachinus*, *Percis*, *Pinguipes*, *Percophis*, and *Uranoscopus*. In the sixth and last division the ventral fins are placed behind the pectorals. It comprises the genera *Sphyræna*, *Paralepis*, and *Polynemus*.

(6192) PERDICIDÆ, the name of a family, or, according to some, a sub-family of *Tetraonidæ*: in the latter case the form should be *Perdicinæ*.

The genus *Perdix*, Briss., in Mr. Swainson's arrangement, is made to contain the sub-genera *Perdix* (Partridges); *Choetopus* (Francolins); *Coturnix* (Quails); *Ptilopachus*, Sw.; and *Ortyx*, Stephens.

The *Perdicinæ*, according to Mr. G. R. Gray's arrangement, form the first sub-family of the *Tetraonidæ*, and consist of the following genera:—*Ithaginis*, Wagler; *Francolinus*, Briss.; *Perdix*, Lath.; *Starna*, Bonap.; *Lerwa*, Hodgs.; *Arborophila*, Hodgs.; *Cotur nix*, Briss.; *Ptilopachus*, Swains.; *Liponyx*, Vieill. *Ortyx*, Stephens; *Lophortyx*, Bonap.; *Callipepla*, Wagler; *Odontophorus*, Vieill.; and *Tetraogallus* (*Lophophorus* of Jardine and Selby), J. E. Gray. The birds of this group are widely spread over the earth, no quarter of the globe being without some of the family, all of which are more or less esteemed as affording a nutritious and sapid food to man. The ardent temperament of the Partridge has been the theme of many writers on natural history from Pliny downwards, and the parental affection of the female for her young seems to be not less strong than the sexual ardour of the male. The rough nest, which is placed on the ground in corn-fields, meadows, &c., contains from twelve to eighteen or even twenty eggs of a greenish ash-colour; and the hen sits so close that her head not unfrequently falls before the scythe of the mower, as represented in one of Bewick's admirable cuts.

(6193) *Francolinus*. The species occur on the old continent and its islands. The form occurs in Europe, Asia, and Africa. The Francolins are forest birds, perch on trees, and feed on seeds, bulbs, &c. The species is widely distributed. In Europe its habitat appears to be exclusively confined to the southern regions, as Sicily, Malta, and the Neapolitan territories, but it is also found in the north of Africa, and over the greater portion of the Asiatic continent, and in the Himalaya Mountains.

(6194) *Francolinus Ponticerianus*, *Perdix Ponticeriana* of Latham, Ferruginous and Gray Francolin, appears to be confined to Asia. This species, according to Colonel Sykes, is the Teetur of the Mahrattas, and is called a partridge in the Dukhun (Deccan), where it is the most common of birds, frequenting gardens and cultivated lands. The Colonel describes the irides as intense red-brown, and its length, inclusive of the tail (which is 3 inches 6-10ths) as 14 inches. He states that it is not met with in the Ghauts, unless in well cultivated valleys, and not at all on the mountains. It roosts on trees, in which situation the Colonel, on more than one occasion, shot them during the day-time; but this was a rare occurrence. ('Zool. Proc.,' 1832).

Another Francolin, *Francolinus spadiceus*, measuring with the tail (which is 5 inches) 14 inches 7-10ths, is very common in the thick brushwood of the Ghauts. Colonel Sykes had both sexes alive in his possession for some time, and has no doubt that they might be successfully introduced into Europe. He describes them as excellent eating, and says that they rarely take wing or perch. The male has a harsh trysillabic call, Kok-[illegible]ee, whence the Mahrattan name Koku-tree. The female in confinement uttered little notes, like the twittering of a chicken. A male in Colonel Sykes's collection had three large spurs on one leg and two on the other. ('Zool. Proc.,' 1832.)

(6195) *Coturnix* (Brisson).—The species of this genus are vernacularly known as Quails. They are found in the Old World and Australia only.

C. dactylisonans, Mayer (*Tetrao Coturnix*, Linn. *Perdix Coturnix*, Latham). This well known bird, a description of which would be superfluous, seems to be the Ὄρτυξ of Aristotle, who mentions the bird repeatedly in such terms as to its habits and migration as to leave little or no doubt on the point; and the *Coturnix* of the Romans. It is the Quaglia of the Italians; Caille of the French; Wachtel of the Germans. Sofliar and Rhine of the Welsh; and Quail of the English; Lohah and Lowa of the Mahrattas. Col. Sykes, in his valuable paper 'On the Quails and Hemipodii of India' ('Zool. Trans,' vol. ii), in which he states that he found the tongue and the cæca of birds to be of considerable importance in indicating affinities or dissimilarities between genera, notices *C. dactylisonans*, *C. textilis*, *C. erythrorynchac*, *C. Argoondah*, and *C. Pentah*.

(6196) *Coturnix Argoondah*, the Rock-Quail of Dukhun (Deccan), "is readily distinguished by the numerous transverse narrow black bars upon the breast; but the young males and the females want these bars, and vary so much in the markings on the back, that with those disposed to manufacture species from plumage alone, the eleven specimens before me from Dukhun would furnish at least four new species." (Sykes.) The flesh is perfectly white. Col. Sykes says that this is the species used for Quail fights by the natives, and not *C. dactylisonans* or *C. textilis*.

(6197) *Hemipodius*, Temm.; *Turnix*, Bonn.; *Tridactylus*, Lacep.; and *Ortygis*, Ill. The species are found in Europe, Asia, Africa, Australia, and Oceania. Colonel Sykes, in his paper above alluded to, describes three species—*H. pugnax*, *H. Taigoor*, and *H. Dussumieri*. In the stomach of the first he found the remains of black ants, minute coleopterous insects, and grass-seeds; the flesh was in brown and white layers, and the Colonel states that its pugnacious qualities are quite unknown in Dukhun, and even in Java. They were frequently in pairs, but mostly solitary, haunting cultivated lands, especially Chillie fields (*Capsicum annuum*). Their flight he describes as lazy and short, nor are they readily put on the wing. He adds that the Zoological Society had a specimen from Madras, and that it would appear therefore to have an extended geographical range over the Eastern islands and India. We shall presently notice *H. Taigoor*.

(6198) *Hemipodius Dussumieri*, the Button-Quail of European sportsmen in India, he says that it affects short thick grass an fields of pulse of *Dolichos biflorus*, *Phaseolu Max*, and *Ervum Lens*. He never found th bird otherwise than solitary, and says tha it is so difficult to flush, that it not unfrequently rises from beneath the feet; and whe on the wing, its flight is so abrupt, angular, an short, that it is generally down before the gun i well up to the shoulder.

H. Taigoor is chestnut above, feathers mar gined with straw colour, and with undulate bands of black; wing coverts straw-colour band ed with black; quills brown, chin and thro white, breast banded with black and white, bell and vent dilute ferruginous, irides pale-yellow bill blackish. Length of the body 4 inche 8-10ths, of the tail 1 inch 7-10ths. (Sykes.) Dr Smith remarks that in the Museum of the Arm Medical Department at Fort Pitt, Chatham there are the male and female of an Indian spe cies of *Hemipodius* very closely resembling th Doctor's *Hemipodius Lepurana*. They diffe however, he observes, in so many minor points that he feels disposed to regard them as be longing to a distinct species. In the Cat logue of the Fort Pitt Collection, Dr. Smith ha named this Asiatic species *Hemipodius Sykesi* in honour of Colonel Sykes, who has added s much to our knowledge of the zoology of Indi ('Illustrations of the Zoology of South Africa. Before we quit this sketch of the Partridges an Quails, we must notice two forms which part cularly demand attention, as leading to oth types. The first of these, the Sanguine Partrid (*Perdix cruenta*, Pl. Col., 332), appears to be the following generic names: *Ithaginis*, Wagl *Plectrophorus*, J. E. Gray, and *Ptilopachus*, Sw It is described as a pheasant in 'Linn. Trans vol. xiii., and may be considered as uniting t Partridges with the Pheasants and the Pol plectrons, like the latter of which, it has ofte more than one spur upon the tarsi. The plum age of this bird, which is a native of Nepau is brilliant, and the feathers of the head and nec are elongated.

The *P. Lerwa*, described by Mr. Hod son ('Zool. Proc.,' 1833) inhabits, accordi to that gentleman, the northern region of N paul, and forms by its half-plumed tarsi a sort of link between the Partridges and the Grouse, the latter of which it resembles in its habits. It is found close to the permanent snows, among rocks and low brush-wood, feeding upon aromatic buds, leaves, and small insects. The plumage is black, lineated transversely with white and chestnut; the breast is brown. Mr Hodgson remarks that the great comparative expanse of the wing, the diminution of its rounded form by the second quill-feather being the longest, the increased length and strength of the tail, and the extent of the feathering of the tarsi, are very remarkable characters, which give to this species a strong interest.—*Eng. Cyc.*

(6199) PERGULARIA ODORATISSIMA. ASCLEPIACEÆ. FRAGRANT PERGULARIA. This is a creeper with a climbing woody stem, racked bark, flowers yellow, and very fragrant, well adapted for covering trellis work.—*Jaffrey.*

In the gardens in Maulmain, this fragrant lowered creeper is often cultivated. *Mason* Pergularia pallida, 585. is given by Wight.

(6200) PERINSIRAGUM. ANETHUM FŒNICULUM Linn. Sweet Fennel

Perinsiragum, TAM.
Variari, GUZ.
Souf, DUK.

Perinsiragum is a name sometimes also given o Aniseed.—*Ainslie's Mat. Med. p.* 267.

(6201) PERIPLOCA SYLVESTRIS. Willd: Root of the Periploca of the woods.

Sirroo Cooringa-vayr, TAM.

This bitter root is supposed by the Native Practitioners to possess virtues in cases of snake ite. Internally it is prescribed in decoction and he powder is applied to the part that is bitten. The plant of which this is the root is called by ne Cyngalese Binnuge, the root itself they suppose to possess virtues similar to our Ipecacuan. —*Ains. Mat. Med. p.* 114.

(6202) PERISTROPHE LANCEOLARIA, CANTHACEÆ. Peristrophe Speciosa, Vide Justia.

(6203) PERISTROPHE MONTANA.

(6204) PERISTYLUS. This elegant terrestri- Tenasserim orchid with snowy blossoms is casionally seen. *Mason.* Wight, in Icones, gives eristylus exilis, 1698; Lawii, 1695; plantagieus, 921; Richardianus, 1697; robustior, 1699; iralis, 1696.

(6205) PERRY. A fermented liquor made om pears, in the same manner as cider is from ples. It is chiefly made in Worcestershire.

(6206) PERSEA, a genus of Plants belong- g to the natural order *Lauraceæ*. *P. gratissima* the Avocado Pear of the West Indies, and ceives its name in consequence of the resem- ance in form between its fruit and that of a uropean pear. The plant which bears it is a tree about the size of an apple-tree; the leaves are oblong, veiny, and the flowers small, and of a greenish-yellow colour. The fruit is the size of a large pear, and is regarded as one of the best produced in the West India Islands. In the inside it is yellow, and contains a kernel inclosed in a soft rind. In taste it is said to resemble the peach, but to be much more agreeable, though not so sweet. It is sometimes eaten with pepper and salt, but more frequently with a little sugar and lime-juice. Three varieties are mentioned, the red, the purple, and the green.—*Eng. Cyc.* Wight gives; Persea gratissima, 1823.

(6207) PERSIAN. A silken fabric of various colours, and exceedingly flimsey in its texture. It is chiefly used in lining.—*Faulkner.*

(6208) PERSOONIA. PROTEACEÆ. The Dele, the Embothrium, the Hakea, Banksia, and Persoonia, are interesting plants introduced from the Cape and New South Wales, the species being chiefly confined to the southern hemisphere. They are handsome green shrubs, and prized by gardeners for the neatness of their appearance and beauty.—*Riddell.*

(6209) PERUVIAN BARK, CINCHONA BARK, CASCARILLA BARK. (so named in America). A celebrated medicine obtained from a genius of trees (*Cinchona*), confined to the lofty Cordilleras of the Andes in South America, and well known for its febrifuge properties. There are many varieties, and as mixtures and adulterations are very common, great experience is requisite to be able to select the finer kinds. Four sorts are distinguished by British druggists, under the appellations of *Crown* bark, *Gray* bark, *Yellow* bark, and *Red* bark.—*Faulkner.*

(6210) PESSALOO. PHASEOLUS RADIATUS.

Pessaloo, TEL.
Pucha payaroo, TAM.
Haree moong, HIND.

(6211) PETREA. VERBENACEÆ. This is a climbing plant with dark shining green leaves, and beautiful lilac or purple flowers hanging in racemes. It is a native of South America, and only requires to be regularly watered, and grown in a good garden soil, to cause it to extend itself over an immense space, its long slender whip-like shoots should be lopped down, to make it throw out branches, at the end of which the flowers appear in most elegant festoons towards the close of the cold season. It is easily propagated by layers.

(6212) PETROLEUM. BITUMEN. ROCK. OIL.

Muntylum, TAM.
Muttee ka tail, DUK. and HIND.
Neft, ARAB.
Minna tanna, MALAY.
Boomie tylum, TEL.
Japoo, SUMATRAN.
Kesoso no ãbrâ, JAPANESE.

This substance is called earth oil by the English in India, and is brought to this country from Bussorah from the Sooloo island, or from the kingdom of Ava :- it is also found in Japan and Sumatra.—*Ainslie's Mat. Med. page* 31. Petroleum is officinal but little used by the Hakeems at Lahore. Petroleum Punjabinum is a product of the hills on the west side of the Indus, called Tukle Reisar near Banu and Tank, procurable in the bazar of Dhera Ismail Khan. It is of a reddish color, lumped as spirit at Lahore. I used this and also another sort, which I had from Bombay.—*Dr. Honigberger, p.* 322.

Petroleum, as its name indicates, is an oil-like exudation from rocks, which has been employed in medicine from the earliest times, though little used now. It is very abundantly diffused, and in other forms, as of Asphalte, Naptha, &c. Besides in Barbadoes and Trinidad, Petroleum is found floating on some springs of water in this country, as at Colebrooke Dale, &c., in many parts of Europe, also at Baku on the shores of the Caspian, and very abundantly at Ranangoong, or Earth-oil Creek, on the banks of the Irrawaddy. Col. Symes describes the wells as about 500 in number, and that upwards of 400,000 hogsheads are taken away in boats. It may readily be obtained by digging into the sand in warm weather. This was examined by Drs. Christison and Gregory, who found in it Paraffin, Eupion, which Reichenbach met with among the products of the destructive distillation of wood; whence they infer that "Rangoon Petroleum is the product of the destructive distillation of vegetable matter," probably from subterraneous causes now in operation. Petroleum has the consistence of treacle; reddish-brown or black colour, with a bituminous taste; floats on water, in which it is insoluble; burns with a dense black smoke, leaving a carbonaceous residuum. Acids, alkalis, and Rectified Spirit have little effect on it; Ether and both Volatile and Fixed Oils dissolve it. Exposed to the air, it hardens into Asphalte: if exposed to heat, a yellowish coloured liquid distils over, which resembles the Naphtha obtained in making Coal-gas. Both are free from Oxygen, and therefore used for preserving Potassium and dissolving Caoutchouc.

Action. Uses. Stimulant; has been recommended externally in Rheumatism and in Cutaneous affections; internally as a Vermifuge. The Rangoon is probably as good, if not better, than other kinds. *Royle.*—Petroleum was collected in a recent survey of Cheduba, on the Arracan coast, and is found abundantly in the Burman Empire. The town of Rai-nan-ghong, is the centre of a small district, in which there are some hundred petroleum wells, (more than five hundred, *Mason*) in full activity. The district in which they are situated consists of a sandy loam, resting upon alternate strata of sandstone and indurated clay: under these is a layer of pale, blue, argillaceous schist, of considerable thickness, impregnated with petroleum: and resting upon coal. The petroleum flows into the well when it is sunk a few feet into the schist, and when it begins to fail the well is deepened. It is remarkable that no water ever penetrates into these wells. The annual quantity of petroleum produced by the district, exceeds 400,000 hhds. The uses of petroleum, where it abounds are very important. It serves the lower classes, instead of oil, for lamps, and mixed with earth or ashes, answers the purposes of fuel. A composition of petroleum and resin is an excellent material for covering wood work and for paying the bottoms of ships and boats, as it protects the timber from the attacks of worms and insects. When rectified by distillation, it affords naphtha.—*Tomlinson.*

Asphaltum, or *black Bitumen*, (Zift-roomie, *Pers.*) is a deep black, pitch-like solid; hard, softens at 150°, and melts above that; highly inflammable, believed to be the result of the natural distillation of petroleum. It is produced in abundance in Barbadoes and Mesopotamia. It is a valuable lacquer for the protection of iron or tinned iron vessels. A lump rubbed over the Asphalt-heated metal coats it with a hard adhesive brilliant coat, which resists most of the common corrosive agents.—*O'Shaughnessy, page* 693. See Bitumen: also Naphtha: also Rock Oil.

(6213) PETROSELINUM, (Πετροσέλινον, which means Rock Parsley, rock being the habitat of the species), a genus of Plants belonging to the natural order *Umbelliferæ.*—*Eng. Cyc.*

(6214) PTEROSPERMUM INDICUM. Kiabooca. A handsome specimen of this ornamental wood was exhibited by Dr. Sanderson, it is imported from Singapore It is beautifully mottled, of different tints, evidently produced by excrescences from the tree. The wood is chiefly used for inlaying or for making desks, snuf boxes, puzzles, &c.—these are exhibited by the Madras Local Committee.—*M.E.J.R.*

(6215) PETROSELINUM SATIVUM, Common Parsley, has tripinnate shining leaves leaflets of the lower leaves ovate-cuneate, trifid and toothed; of the upper leaves ternate, lanceolate, entire. It grows wild on rocks and ol walls, and is extensively cultivated —*Eng. Cyc.*

(6216) PETUNIA. Solanaceæ. This is a ornamental genus of plants, and easy of cultivation, the colours are white, purple, crimson an purple, or rose coloured; they grow readily fro seed either in the rains, or cold weather, an form pretty border flowers.—*Riddell.*

(6217) PETUNTZE, the Chinese name for a white earth used with Kaolin in the manufacture of porcelain. It is stated that while [KAOLIN] is derived from the decomposition of the felspar of granitic rocks, the latter, or Petuntze, is the same mineral which has not suffered decomposition, and that on account of its fusibility it is employed in glazing the porcelain.—*Eng. Cyc.*

(6218) PEWTER.

Risas,	ARAB.	Stagno,	IT.
Etain,	FR.	Olowo,	RUS.
Zinn, Zinngeisserzinn,	GER.	Estaño, Peltre.	SP.

A factitious metal made of four parts of tin, and one of lead; but a finer kind is said to consist of tin mixed only with a little antimony and Copper. It is used in making plates, dishes, spoons, and such other domestic articles. *Faulkner.*

(6219) PHACELIA. *Hydrophylleæ.*—Hardy plants, flourishing in any common soil; the flowers are curious, from the manner in which they slowly unroll themselves. Some are perennials, and others biennials; the flowers are chiefly pink and blue coloured—propagated from seed.—*Riddell.*

(6220) PHAETON, Linnæus, a genus of Palmipede Birds, placed by some ornithologists among the *Pelecanidæ*, and by others among the *Laridæ*. This genus, so well known to naviga-ors as the harbinger of the tropics, is distinguished at once by the two long slender tail-eathers, which have obtained for the species, of which two only are recorded, the French name of Paille-en-Queue, and from the English the Boatswain. Their length of wing and compar-tive feeble feet proclaim them formed for flight, and they are accordingly swift and untired on the wing, disporting in the air far at sea; and when on land (to which they do not often retreat or any length of time together, except at the period of nidification), perching on rocks and rees. They rarely quit the torrid zone and its neighbourhood. M. Lesson remarks that the wo species form a well-defined artificial and purely geographical group. Their habitual domicile in the torrid zone does not separate them rom the land; and they can reach, as they do nearly every night, the isles and lofty rocks that erves them as a place of refuge. Nevertheless M. Lesson met with them so often in sea-tracts ntirely devoid of land, and heard them so often bove his head in the calms and fine tropical nights, that he thinks they should be considered s oceanic birds. The same author remarks that udden squalls or hurricanes, so frequent in the quatorial zone, often sweep these birds beyond heir natural limits; and he thus accounts for eeing them, as he many times did, in 30° S. lat. The Common Tropic-Bird (*Phaeton æthereus,*) he says, " semble etre confine dans l'ocean Atlantique, et s'arreter dans les mers de l'Inde." The other species (*Phaeton phœnicurus*), he remarks, appears to belong more particularly to the great equinoctial ocean. Nevertheless, he adds, that both species exist in nearly equal numbers at the islands of Mauritius and Bourbon. He describes the flight of these birds as calm, quiet, and composed of frequent strokes of the wing, sometimes interrupted by a sort of falls or sudden movements.—*Eng. Cyc.*

(6221) PHAETON ŒTHEREUS, Linn., the Tropic Bird of Catesby, Sloane, and others. The following is Catesby's description:—" This bird is about the size of a partridge, and has very long wings; the bill is red, with an angle under the lower mandible, like those of the gull kind, of which it is a species; the eyes are encompassed with black, which ends in a point towards the back of the head; three or four of the larger quill-feathers towards their ends are black tipped with white; all the rest of the bird is white, except the back, which is variegated with curved lines of black; the legs and feet are of a vermilion red; the toes are webbed; the tail consists of two long straight narrow feathers almost of equal breadth from their quills to their points. " These birds," says the same author, " are rarely seen but between the tropics at the remotest distance from land. Their name seems to imply the limits of their abode; and though they are seldom seen but a few degrees north or south of either tropic, yet one of their breeding-places is almost nine degrees from the northern tropic, namely, at Bermudas; where, from the high rocks that environ those islands, I have shot them at the time of their breeding; but those cliffs being inaccessible, prevented my seeing their nests and eggs. They breed also in great numbers on some little islands at the east end of Porto Rico. There was a specimen in Tradescant's Museum.—*Eng. Cyc.*

(6222) PHAETON PHŒNICURUS. Length from the extremity of the bill to the origin of the tail, 13 inches 6 lines; of the bill from the point to the commissure, 3 inches 8 lines; breadth across the expanded wings, 31 inches. Length of the tail, 5 inches; of one lengthened tail-feather (brin) taken at the extremity of the tail, 7 inches 6 lines; of the second and smaller long tail-feather (brin) taken from its origin, 6 inches. Ten tail-feathers, without counting the long one, which at its origin is enlarged like the other feathers; the tail forms a fan. Feet, taken from the leg to the toes, 3 inches. Legs white, with a light bluish tint in some places; webs partly black, that between the hind toe pale flesh-colour slightly glazed with white. Bill red, denticulated; nostrils near the origin of the bill, rather large, presenting forwards a canal which scarcely extends to the middle of its length, and of a blackish tint. Plumage satin-white; in front of the eyes a large brown spot. The anal feathers present a great black spot in their centre, as well as some of the feathers which approach the body. The long tail-feathers (brins) are red, the smallest being of the deepest hue. The shafts of the greater quill-feathers, of the tail feathers, and the long tail-feathers (brins), are black, but towards the extremity they are white. ('Mannel.') —*Eng. Cyc.*

(6223) PHALLUS ESCULENTUS Morilla (Fungus) Morels are imported from the hills into Lahore but are very little used by the natives; and the English use them, not medicinally, but for culinary purposes. The Morels which are brought from the Hazara country, are large.—*Honig. p.* 323.

(6224) PHARBITIS, a genus of Plants belonging to the natural order *Convolvulaceæ.* It has 5 sepals a campanulate funnel-shaped corolla, 1 style, a capitate granular stigma, a 3-celled, rarely 4-celled ovary, and 2-seeded cells. The species of this genus are easily distinguished from others of the same order. They are mostly climbing American herbs, usually beset with retrograde hairs.—*Eng. Cyc.*

(6225) PHARBITIS CÆRULEA. Wall. Syn. IPOMÆA CÆRULEA. *Kon. Rox. Fl. Ind.* i. p. 501. Nearly allied to Pharbitis Nil; but probably a distinct species.

Hub ul nil, ARAB.	Kaladana and Mirchai, HIND. and BENG.

Common all over the tropics every where, and in India even ascends the mountains to 5000 feet elevation.—*O'Shaughnessy, p.* 505. Its *Seeds,* called Hub ul nil, Kaladana, Mirchai, are black, angular, weighing on an average ½ a grain each, in powder of a grey colour, of sweetish, and subsequently rather acrid taste, and heavy smell. On analysis yields resin, gum, starch, fixed bland oil, fibre, and colouring matter. The powdered seeds in doses of 30 to 40 grains act as a quick, safe, and pleasant cathartic. Dr. O'Shaughnessy made this seed the subject of numerous experiments. In 100 cases in which it was given under his direction in the Police Hospital of Calcutta it proved purgative in 94, occasioned vomiting in 5, and griping but in 15, and produced on an average 5 stools within 2½ hours; the operation generally commenced in an hour, and in these experiments was never delayed beyond four hours. The alcoholic extract, which consists of resin and oil, is deep brown, ductile, of excellent pillular consistence, and keeps for several months. In 10 grain doses it produces all the effects of jalap with certainty and speed; the taste is scarcely perceptible. Dr. Chapman has used it in several cases at the General Hospital, and reported on it most favourably to the Medical Board; Dr. Leckie of Bhagulpore, Dr. Green of Howrah, Drs. Martin, Stewart and Goodeve, have given similar accounts of its efficacy. The seeds sell for four seers (8. lbs.) for the rupee; these will yield from 15 to 20 per 100 of alcoholic extract, and the whole of the alcohol may be recovered by distillation. We have thus a remedy of unparalleled cheapness, perfectly equal to jalap as a cathartic, superior to it in portability, and flavour, and occurring in all parts of India. We are consequently independent in every respect of the South American article.—*O'Shaughnessy. page* 505—6.

(6226) PHARBITIS HISPIDA. CONVOLVULACEÆ. The Pale blue large flowered Pharbitis.—*Riddell.*

(6227) PHARBITIS NIL, has twining annual round hairy branches, and stem stalked; 3-lobed downy leaves; axillary peduncles, from 2- to 3-flowered. The flowers large, of a beautiful light bright bluecolour; the capsule is much shorter than the calyx, smooth, 3-celled, with two seeds in each cell. The seeds are sold in the apothecaries' shops of Calcutta under the name of 'Kala Dana,' and are said to act as a purgative and an effectual speedy carthartic. They are roasted like coffee, powdered, and administered in doses of from 30 to 40 grains. It is a native of the tropics in every part, and in the South Sea Islands. There are about 15 species of this genus, but the one described is the only one of use.—*Lind. Flor. Med.—Eng. Cyc.*

(6228) PHARID-BUTI. A mucilaginous plant found at Ajmeer: used in sherbets.—*Gen. Med. Top. p.* 14?.

(6229) PHARNACEUM MOLLUGO: LADIES BED STREW.

Ghimasag, HIND.

Wild in gardens during the rains, sometimes used as a pot herb.—*Gen. Med. Top. p* 188.

(6230) PHASEOLUS, a genus of Plants of the tribe *Phaseoleæ,* in the natural order *Leguminosæ.* The name is said to be derived from Phaselus, a little boat, which the pods are thought to resemble; but it may be that the meaning of 'boat' is derived from the resemblance of a boat to the form of a bean. Two species are very well known in England, *P. vulgaris,* the Common Kidney Bean, and *P. multiflorus,* the Scarlet Runner; their unripe pods being much esteemed as legumes, and also for pickling. The ripe seeds are however employed on the continent, and form the Haricots of the French. The genus is however one of which the species are indigenous in tropical parts both of the Old and New World. Several are cultivated in India, and are some of the principal articles of the agriculturist's attention, as the ripe seeds of several species form pulses which are much used by the natives as a portion of their diet, and some of which, like the Kidney Bean, abound in nutritious matter.

Phaseolus is characterised by having a bell-shaped 2-lipped calyx. The corolla is papilionaceous, and has the keel, as well as the diadelphous stamens and the style, spirally twisted.

The legume is compressed or cylindrical, with two valves, and is many-seeded, with more or less conspicuous cellular partitions between the seeds. The hilum of the seeds is oval oblong. The plants are herbaceous or suffrutescent in habit. The leaves are pinnately trifoliate, the leaflets with partial stipules. Racemes axillary. Pedicels usually in pairs, single flowered. Wight, in Icones, gives Phaseolus lunatus, 755; psoraleoides, 249; Pulniensis, 202; rostratus, 34; and trilobus, 94.

(6231) PHASEOLUS ACONITIFOLIUS, Lin.

Tulka, pyre, TAM.
Mat, GUZ.
Moat, DUK. & HIND.
Kooneooma pesuloo, TEL.
Vasunta, SANS.

This is a small pleasant tasted pulse, much cultivated in the higher provinces of India, where there are two kinds of it.—*Ainslie, page* 246. Moth of the natives, is cultivated in the north-western provinces, and used for feeding cattle.—*Eng. Cyc.* Phaseolus Aconitifolius is culvitated in the Punjab, and for food. Its roots, as well as those of Phaseolus radiatus, are said by Royle, to be narcotic.—*Dr. Honigberger, p.* 323.

(6232) PHASEOLUS AUREUS, or Sona Moong of the Bengalees, is found in a cultivated state in the Bengal presidency, but is not known on the Coromandel Coast. It is sown, like the others, about the end of October or beginning of November, and reaped in February or the beginning of March.—*Eng. Cyc.*

(6233) PHASEOLUS LUNATUS, DUFFIN BEAN.

Bunburbutee, HIND.

Sown in rows the same as other beans, but with a much greater space between; they require very strong sticks for support, and are ready in about six months. No very particular care is necessary.—*Jaffrey.* This is a most valuable bean, much prized by the European inhabitans of India; by some of whom it is preferred to the Windsor bean. It was originally brought to this country from Mauritius and is extremely prolific.—*Ainslie, p.* 240.

(6234) PHASEOLUS LUNATUS. Var. COUNTRY BEAN; DUFFEN BEAN. This is a pleasant tasted bean much cultivated by the Europeans in these provinces whither it was brought some years ago from the Isle of France. —*Ainslie, p.* 239..

(6235) PHASEOLUS MAX. BLACK ULANDOO.

Carpoo Ulandoo, TAM.
Klie Oorood, DUK.
Nulla Woodooloo, also Minoinolu, TEL.
Mash, ARAB.
Benoo mash, PERS.
Wooddoo, MAL.
Chicuda, CAN.
Masha, SANS.

This pulse differs but little from the common Ulundoo, except that it is of a darker color, and somewhat larger.—*Ainslie, p.* 237.

The Moong of the natives, and Black Gram of the English, is like *P. Mungo* but distinguished by its black seeds, and is, like it, found in a cultivated state; it takes about the same time to ripen, and yields nearly the same produce.—*Eng. Cyc.*

(6236) PHASEOLUS MULTIFLORUS, the Scarlet Runner, is a native of South America. Both are delicate, and in England cannot be safely planted in the open air till the beginning of May. —*Eng. Cyc.*

(6237) PHASEOLUS MUNGO. MASH.

Woothooloo, TEL.
Mash, HIND.
Wooloonthoo, TAM.

(6238) PHASEOLUS MUNGO, MELANOSPERMUS. BLACK GRAM. Mason says that one of the most common pulses seen in Burmah is the *Phaseolus max*; which is the plant that produces the black gram of India.—*Mason.*

(6239) PHASEOLUS MUNGO.

Moong ka dal, HIND.

Cultivated in the rains wherever the soil will premit.—*Genl. Med. Top. p.* 203.

(6240) PHASEOLUS MUNGO. ULANDOO, Lin.

Ulandoo, TAM.
Arad, GUZ.
Oorood, DUK. & HIND.
Wooddooloo, TEL.
Hessaru, CAN.
Moong, MAH.
Danie Masha, SANS.

This very pleasant tasted pulse is much prized, dressed in various ways. Phaseolus Mungo, or Moong, is one of the dry leguminous grains of India, which are of great value whenever the periodical rains fail and rice cannot be grown, and famine is the consequence.—*Eng. Cyc.*

Two sorts of this pulse are grown in all parts of Mysore and are exported to Mangalore. It will keep good for about three years if carefully preserved by packing it in parcels. Ordinary price at Bangalore is a Rupee for ? seers.—*Ainslie, page* 247. *M. E. J. R.*

(6241) PHASEOLUS NANUS. DWARF KIDNEY BEAN.

Frash bean, HIND.

Cultivated. in Ajmere—*Med. Top. p.* 203.

(6242) PHASEOLUS RADIATUS. INDIAN GREEN GRAM, or Rayed kidney Bean.

Putsa pasaloo, TEL.
Harree moong, HIND.
Putchee payaroo, TAM.
Mag, GUZ.
Masha, SANS.
Mash Kulia, BENG.
Harie Moong, DUK.
Hasaroo, CAN.
Harita, SANS.
Cherroo Poiur, MAL.
Moong, Thikiree, HIND.

Roots said to be narcotic by Royle—*O'Shaughnaes p.* 317. Phaseolus Radiatus called by the natives Mash and Oorud, is like P. Max and P. Mungo found in a cultivated state, and is the most esteemed of all the Indian leguminous plants. Besides using it as an article of diet, the natives make bread-of the meal for some of their religious ceremonies.

(6243) PHASEOLUS RADIATUS (Var.) BLACK GRAM.

Nulla woothooloo, Tel. | Karooppoodooloonthoo, Tam.
Kalee Kooltee, Hind. | Panay Pyroo, Tam.

This valuable pulse gets its Tamool name from being nourished by the dews in January and February. It is a variety of the Patchay pyre. —*Ainslie, p.* 243.

(6244) PHASEOLUS TRILOBUS, Three-lobed Bean.

Moojanee, Beng. | Kulaee, Hind.
Trianguli. Hind.

Sown like other native beans. This species of phaseolus, the genus which furnishes the common French bean, grows spontaneously everywhere in the Tenasserim Provinces. Roxburgh describing the species says, that he never found it "*but in its wild state*;" while Voigt is made to say, by a mistake of the printer no doubt, "Cultivated, in which state only it was found by Dr. Roxburgh."—*Mason.* The leaves are said to be tonic and sedative, and are used in cataplasms to weak eyes.—*O'Shaughnessy, p.* 137.

(6245) PHASEOLUS VULGARIS, Kidney-Bean, is said to be a native of India, but Dr. Royle states that seeds were brought to him from Cashmere, and he is therefore inclined to consider that it was introduced into Europe from the most northern parts, such as Cabul and Cashmere and that this accounts for our being able to cultivate it at a lower temperature than other species of the genus.—*Eng. Cyc.*

(6246) PHASIANIDÆ, a family of Rasorial Birds related to the *Pavonidæ.* [Pavonidæ.] Mr. G. R. Gray arranges the *Phasianidæ* as the second family of *Rasores*—*Cracidæ* being the first, and he divides the *Phasianidæ* into the subfamilies *Pavoninæ*, *Phasianinæ*, *Gallinæ*, and *Meleagrinæ*. The *Phasianinæ* consists of the genera *Argus*, *Phasianus*. *Syrmaticus*, *Thaumalea*, and *Gennæus*. The *Gallinæ* comprehend the genera *Euplocamus*, *Monaulus*, *Lophophorus*, *Gallus*, and *Tragopan*.

(6247) *Phasianus* (Linn.).—Bill of mean length, strong; upper mandible convex, naked at the base, and with the tip bent downwards. Nostrils basal, lateral, covered with a cartilaginous scale; cheeks and region of the eyes destitute of feathers, and covered with verrucose red skin. Wings short, the first quills equally narrowed towards their tips, the fourth and fifth the longest. Tail long, regularly wedge-shaped, and composed of 18 feathers. Feet having the three anterior toes united by a membrane as far as the first joint, and the hind toe articulated upon the tarsus, which in the male birds is furnished with a horny cone-shaped sharp spur. (Gould.) The type of this genus is generally considered to be *P. Colchicus*, Linn., the Common Pheasant, a bird which, though not originally British, is completely naturalised in that Island, and indeed appears to adapt itself with great facility to most countries where ordinary care is taken to preserve it, and the temperature is not too low for its constitution. The species is too well known to need description. Various instances of the Common Pheasant breeding with other gallinaceous birds are on record. Edwards has figured a bird supposed to have been produced between a pheasant and a turkey. Three or four of these were discovered in the woods near the house of Henry Seymour, Esq., of Handford, Dorsetshire, and he shot one in October 1759, the bird which he sent to Edwards. Mr Yarrell ('British Birds') observes that he has twice been shown birds that were said to be the produce of the Pheasant and the Guinea Fowl, and the evidence of the plumage was in favour of the statement. We have seen such a bird, and its feathers corroborated the allegation that it had been so produced. Hybrids between the Pheasant and Gray Hen are also recorded. Mr. Thompson of Belfast describes ('Magazine of Zoology and Botany') another hybrid shot at Lochnaw, Wigtonshire, where it had been seen several times on the wing by persons who supposed it to be a wild turkey. In the surrounding plantations pheasants and black grouse were numerous; but this individual, which was preserved for Sir Andrew Agnew, Bart., M.P., was the only one of the kind observed. Mr. John Leadbeater, in 1837, exhibited a hybrid between the Pheasant and Black Grouse, shot near Alnwick, at a meeting of the Zoological Society This the Duke of Northumberland presented to the British Museum. The union between the Common Hen and the Cock Pheasant is by no means rare, as is well known to those whose homesteads border upon pheasant preserves. The produce of this union is called a Pero.

Before we leave the True Pheasants we must notice some of the magnificent Indian species, which exhibit such a prodigality of splendour and beauty in their plumage as almost realises the birds which we read of in fairy tales. Such are the well-known gorgeous Gold Pheasant (*Phasianus pictus*, Linn: Genus, *Thaumalea*, Wagler; *Chrysolophus*, J. E. Gray; *Nycthemerus*, Sw.), the equally wellknown delicately-pencilled Silver-Pheasant (*Phasianus Nycthemerus*, Linn.: Genus, *Gennæus*-Wagler; *Nycthemerus*, Sw.; *Euplocomus*, J. E. Gray), and the noble Reeves's Pheasant (*Phasianus veneratus*, Temm.: Genus *Syrmaticus*, Wagler.) The first two of these (natives of China) are common in almost every aviary, and there is no reason why they should not thrive well i turned out in English preserves; the second species has, we believe, been so turned out with success; the last is also found in China, but, as it would seem, on the very confines of the empire. It is very rare in Pekin. Dr. Latham's description was taken from Sir John Anstruther's drawings, and from some writing under them in the Persian language it appeared that the bird vas called Doom duraz, or Long-Tail, and it vas found on the snowy mountains of Surinagur. 'o Mr. Reeves we are indebted for the first indiidual ever brought alive to Europe. It was a nale, and continued to live for some time in the arden in the Regent's Park. Tail-feathers from t were exhibited to the Society in 1831, measurng each about 5 feet 6 inches in length. A econd male specimen was also sent to their menagerie by the same liberal donor in 1834. 'hen there are the beautiful Diard's Pheasant *Phasianus versicolor*, Vieill.) which haunts the apanese woods, and exhibits the manners and abits of our Common Pheasant; the rare and legant Sommering's Pheasant (*P. Sœmmeringii*, 'emm.), also a native of Japan. We should alo call the reader's attention to the beautiful '. *Stacei* (figured and described by Mr. ould in his 'Century') as one of the True 'heasants and to *P. Pucrasia* and *P. alboristatus*, also there figured. *Pucrasia* appears o lead the way from the True Pheasants to ne *Lophophori*; and *P. albo-cristatus* to be n *Euplocamus*, which, even more immediately nan *E. ignitus*, forms a transition from the genus *'hasianus* to the genus *Gallus*. The Argus heasant, which is not a species of *Phasianus*, as been brought alive to this country, and a pecimen is now in the Gardens of the Zoological ociety of London in the Regent's Park.

(6248) *Euplocamus* (Temm.).—Sir George taunton, in his 'Embassy to China,' first made is highly-interesting form known to European ologists. His host at Batavia had, it appears, a ery curious collection in the several departments natural history. He made presents to his guest several specimens, and among them was this eautiful pheasant, which was sent to England nd described by Dr. Shaw.

(6249) *E. ignitus*, the Fire-Backed Pheasant of va, the Macartney Cock, *Phasianus ignitus* Laam. Length of adult *male* about two feet. Skin the nostrils stretching backwards over the sides the head behind the eyes, and bluish-purple. crest upon the crown of the head composed naked-shafted feathers, expanding at their s into slender-spreading barbs. Head, neck, east, belly, and upper part of the back, deep alybean or steel-blueshot black; lower part of e back fiery orange-red or flame-colour, varyg in intensity according to the incidence of the ht, and passing like a zone round the body, ough more obscure on the abdomen; rump and il-coverts broad and truncated, brilliant bluisheen with a paler bar at the tip. Tail when erect ded in some degree like that of a hen; the mid- feathers white, and the outside ones black with en reflections. Legs and feet vermilion, spurred.

Female.—Length about 20 inches. Plumage nost entirely rich cinnamon-brown; feathers the upper parts slightly mottled with black; roat white; lower parts of a paler tint than those above, and having the feathers bordered with white. Elongated head-feathers capable of being erected into a crest, but not equal to that of the male. Tail folded. Legs spurless. It is a native of Sumatra. ('Atlas' to Staunton's 'Account of Lord Macartney's Embassy to China.')

(6250) *Gallus* (Brisson).—Bill moderate, strong, convex above, curved towards the point, naked at the base, and furnished with two pendant and compressed caruncles or wattles. Head surmounted with a fleshy crest or comb. Tarsi (in the male) furnished with a long and recurved spur; the hind toe only resting on the ground at its tip. Wings short and graduated. The 14 tail-feathers forming two vertical planes with the backs of the feathers towards each other, and so making what may be called a folded tail; the middle feathers longest and recurved. The ancestors from which our domestic poultry have descended were undoubtedly natives of Asia; but some doubt still hangs over the questions of the precise breed from which they came, and the exact locality where they were found. That fowls were domesticated at a very early period there is no doubt, and both historians and poets speak of the high antiquity of the race. Thus Peisthetærus relates why the cock is called Περσικὸς ὄρνις (the Persian Bird), and how it reigned over that country before Darius and Megabazus. (Aristoph., 'Birds,' 483 et seq.) To the forests and jungles of India we must look for the race in a state of nature; and though the denizens of the farm-yards may be the result of a mixture of many of the species which there inhabit, zoologists in general agree with M. Temminck in thinking that to the Malay Gigantic Cock or Fowl (*Gallus giganteus*, Temm.), and the Bankiva Cock (*G. Bankiva*, Temm.), we are chiefly, if not entirely indebted for our common poultry. The Domestic Cock and Hen are the 'Αλεκτρυών and 'Αλεκτορίς of the Greeks; Gallus and Gallina of the Romans; Gallo and Gallina of the Italians; Haus Hahn and Haus Henne of the Germans; and Coq (Gau, Geau, Gal, Gog), Gelline, and Poule, of the French. Bold, ardent, and vigilant, the cock has been always considered the emblem of watchful courage, whilst the hen has been considered a pattern of maternal solicitude. In this and other polygamous species, the object to be attained is the effective impregnation of the greatest numbers of females by the most vigorous male. In the cock accordingly the spurs are developed as the sexual organs are matured; and it is principally with these weapons of combat that the battle which is to leave the field in the possession of the strongest is decided. The conqueror in his turn, as the weakness of age comes upon him, yields to a younger and more powerful rival; and thus a numerous, healthy, and stout progeny is secured.

(6251) *G. giganteus*, the Gigantic Cock, the

Kulm Cock of Europeans, often stands considerably more than two feet from the crown of the head to the ground. The comb extends backwards in a line with the eyes; it is thick, a little elevated, rounded upon the top, and has almost the appearance of having been cut off. The wattles of the under mandibles are comparatively small, and the throat is bare. Pale golden-reddish hackles ornament the head, neck, and upper part of the back, and some of these spring before the bare part of the throat. Middle of the back and lesser wing-coverts deep chestnut, the webs of the feathers disunited; pale reddish-yellow long drooping hackles cover the rump and base of the tail, which last is very ample and entirely of a glossy green, of which colour are the wing-coverts; the secondaries and quills are pale reddish-yellow on their outer webs. All the under parts deep glossy blackish-green with high reflections: the deep chestnut of the base of the feathers appears occasionally, and gives a mottled and interrupted appearance to those parts. (Jardine principally.) Lieutenant-Colonel Sykes, in his Memoir on the Birds found in the Dukhun (Deccan), states that it is only there met with as a domestic bird, and that he has reason to believe that it is not a native of India, but has been introduced by the Mussulmans from Sumatra or Java. The iris, he says, of the real game bird should be whitish or straw-yellow. The Colonel landed two cocks and a hen in England in June, 1831; and they bore the winter well. The hen laid freely, and in September, 1832, had reared two broods of chickens. The cock had not the shrill clear pipe of the domestic bird, and his scale of notes appeared to be more limited. A cock in the Colonel's possession stood 26 inches to the crown of the head, but they attain a greater height. The length from the tip of the bill to the insertion of the tail, 23 inches. Hen one-third smaller than the male. ('Zool Proc.' 1832.)

(6252) *Gallus Bankiva*, the Bankiva Cock, is the Coq et Poule Bankiva of Temminck; Ayam Utan, or Brooga ('Linn. Trans.,' xiii.); Javan Cock of Latham; and many Bantams resemble it very closely. The space round the eyes and throat bare, comb, much developed, deeply lobated along the upper ridge, wattles of the lower mandible rather large; long, clear, brilliant, golden-orange hackles cover the head, sides of the neck, back, and rump. Upper part of the back below the hackles bluish-black, the middle and lesser wing-coverts rich deep-chesnut, with the webs of the feathers disunited; greater coverts steel-blue, secondaries the same, with a broad chesnut border; quills brownish-black, edged with pale reddish-yellow. Tail black, richly glossed with green and blue. Under parts black. Sir W. Jardine states that he has seen three or four specimens of another bird very closely allied to *G. Bankiva*, but rather larger, and certainly distinct: they were all from the continent of India.

(6253) *Gallus æneus*, the Bronzed Cock figured by M. Temminck from a specimen sent from the interior of Sumatra by M. Diard. This is somewhat larger than the Bankiva Cock, and its large comb is without dentilations; indeed the edge is quite unbroken; the feathers of the head, neck, and upper part of the back are rather elongated, but not hackles. The Fork-Tailed Cock (*G. furcatus*, Temm.; *G. Javanicus*, Horsf.) has the comb also entire, and the throat is adorned with a single large wattle springing from the centre. The head, neck, and upper part of the back are covered with feathers, which are not hackles, shorter and more rounded than those in the Bronzed Cock.

(6254) *Gallus Sonneratii*. This is the Coq Sauvage of Sonnerat; Coq et Poule de Sonnerat of Temminck; Sonnerat's Wild Cock of Latham; Rahn Koomrah of the Mahrattas; Jungle Cock and Jungle Fowl of the English sportsmen in India. The size of the male is nearly equal to that of a domestic cock; but the bird is altogether lighter, more graceful, and has a higher bred look about it; comb large, and with an unequal margin, but though this margin is jagged, it is not deeply dentilated; wattles double, depending from the base of the lower mandibles; hackles of the neck and of the wing and tail-coverts dark-grayish, with bright golden-orange shafts dilating in the centre and towards the tip into a flat horny plate. In some of these feathers the shaft takes an elliptica or oar-like shape; in others it puts on the appearance of a long inverted cone, from the centre of the base of which a battledore-like proces arises. The substance and appearance of thes plates have been not inaptly compared with th wax-like plates which ornament the wing and tail of the Bohemian Chatterer. Th effect produced by this modification of th shafts is singular and beautiful. Feathers o the middle of the back, breast, belly, and thighs deep rich gray, with paler shafts and edges; tai generally rich deep-green; the feathers whic immediately succeed the hackles are rich purpl with a pale yellow edge; those next in successio are golden-green, with gray edges, and all ar glossed with brilliant metallic reflections. Bill legs, and feet, yellow. The living bird present altogether a rich and striking object, especiall when the sun shines on the plumage. Female les than the cock by about a third, without comb o wattles, but a trace of nakedness round the eye The plumage (generally) is without the horn structure which distinguishes that of the mal Upper parts uniform brown; neck feathers wit dark edges, those of the back and wing-covert with a pale streak along the shaft, and those the wings, tail-coverts, and tail, waved an mottled with darker pencillings; throat an front of the neck white; feathers of the res of the lower parts grayish-white, edged with dark brown, which predominates towards the vent. Legs and feet bluish-gray. Colonel Sykes, in his valuable Catalogue, notes this noble bird as being very abundant in the woods of the western Ghauts, where (and this is well worthy the attention of ornithologists) he says there are either two species or two very strongly marked varieties. In the valleys, at 2000 feet above the sea, he tells us Sonnerat's species is found slender, standing high upon the legs, and with the yellow cartilaginous spots on the feathers, even in the female. In the belts of wood on the sides of the mountains, at 4000 feet above the sea, there is a short-legged variety. The male has a great deal of red in the plumage, which Sonnerat's has not: the female is of a reddish-brown colour, and is without cartilaginous spots at all: "in fact," continues the Colonel, "the female of this variety is the *G. Stanleyi* of Mr. Gray's 'Illustrations.'" Dr. Latham remarks that this Jungle Fowl is by far the boldest and strongest for its size, and that it is anxiously sought after by cockfighters in Hindustan, who rely on it for victory when pitted against larger game cocks.

(6255) *Tragopan*, Cuvier (*Ceriornis*, Swainson). --Head crested on the crown, partly naked (on the cheeks and round the eyes), the naked parts terminating in horn-like caruncles behindthe eyes; under the lower mandible and on the forepart of the hroat a subpendent composite carunculated wattle. Tarsi armed with a blunt spur in the male; unarmed in the female. Mr. Gould 'Century of Birds from the Himalaya Mounains') remarks that the genus *Tragopan* appears o take an intermediate station between that of *Meleagris*, and the more typical *Phasianidæ*, forming one of the links of a chain connecting these groups of the Rasorial order. The affinity of his genus, he observes, to that of *Meleagris*, is evident in many characters; nor are some wanting which indicate a relationship to *Numida*, and even to *Francolinus*.

(6256) *T. Satyrus* appears to have been the only pecies originally known. Mr. Gould, in his Century,' describes another species, *T. Hastingsii*, nd refers to another, which Dr. Gray, of the British Museum, has dedicated to M. Temminck. Indian Zoology.')

(6257) *T. Hastingsii*. Head of the adult male covered with a pendent crest of feathers, which, as well as the ear-coverts and throat, are lack; the neck and shoulders are rich maroon; he chest, rich, glossy orange-red; the naked skin around the eyes is red; the fleshy horns nd wattles mingled blue and purple; the upper arts exhibit a mixture of zigzag lines and marks of dark and light brown, with numerous and disinct spots of white; each of the upper tail-coverts ends in a large white eye, bordered on he sides with brown, and tipped with black; the tail deepens till it ends in uniform black; the feathers of the under surface are maroon, largely tipped with black, in the centre of which is a large white spot; the beak is black, the tarsi brown. In the young male the plumage is much less brilliant, the wattles being of a pale flesh-colour, and little developed, as is also the naked skin of the face. The plumage of the female consists of a uniform brown, mottled and barred with mingled lines and dots of various tints, the feathers of the back and chest having a central dash of a lighter colour; the head is crested, with short rounded feathers; the sides of the cheeks are clothed, and there are neither fleshy horns nor wattles. (Gould.) Mr. Gould observes, that although this species and *T. Satyrus* are closely allied to each other, and doubtless possess similar habits and manners, he is led to believe that their local distribution is somewhat different; at least, he generally receives but one species in a collection from the same quarter; *T. Satyrus* being transmitted from the Nepaulese Hills, while *T. Hastingsii* is sent from the more northern range of the Himalayas. He further well observes that the changes of plumage which birds of this genus, especially *T. Hastingsii*, undergo in passing from youth to maturity (and this is well illustrated in Mr. Gould's beautiful plates), are such as to have caused an apparently erroneous multiplication of species.

(6258) *T. Satyrus*, according to the same author, is an exclusive inhabitant of the colder regions of the mountains, in conjunction with the *Lophophorus*, its approximate relative, feeding on grains and roots, the larvæ of ants, and other insects.

(6259) PHASMIDÆ, a tribe of Orthopterous Insects, embracing a number of exotic forms which have been often included in the *Mantidæ*, from which they are distinguished by the fore-legs being of the ordinary size, and fitted like the rest for walking rather than running. From the other *Orthoptera* they are distinguished by the hind legs not being saltatorial. The body is generally long and slender. The head is of moderate size, of an oval subdepressed form, porrected, with large globular eyes, in front of which the antennæ are placed, which are variable in form, but ordinarily long, slender, and composed of a great number of articulations. The ocelli are rudimentary or obsolete. The labrum is deeply notched in front; the jaws are strong and horny. The dorsal surface in both sexes consists of nine segments, but only seven are distinct in the females. All the legs are alike, being long and slender, often armed with short spurs along the edges. The fore wings are of small size, and attached at the posterior part of the mesothorax. The true wings are very large and attached to the anterior part of the metathorax. "As they far exceed the wing-covers in size, it is essential that provision should be made for their defence. This is effected not as in the earwig, by the ransverse folding of the wing so as to enable it to be folded beneath the small wing-cover, but by the front margin of the hind wing being greatly thickened, serving as a flat plate, beneath which the other part of the wing is folded longitudinally, the latter part being often differently coloured. Thus in some species the short wing-covers and the front margin of the wing are pale-green, whilst the other part of the wing is pink. Many species however remain throughout their lives without ever acquiring wings or wing-covers." (Westwood, 'History of Insects.') The odd appearance of these insects have got for them the name of Walking-Sticks, Straws, Leaves, Spectres, &c., and certainly nothing can be imagined more curious than the forms they assume. In many instances they might be mistaken for a portion of the branch of the trees on which they rest.—*Eng. Cyc.*

(6260) PHILADELPHACEÆ, *Syringas*, a natural order of Exogenous Polypetalous Plants, with an inferior ovary, the principal genus being that after which the order is named. The species are American, European, and Asiatic shrubs of temperate climates, with opposite leaves, distinct styles, and capsular fruit, containing a large number of minute seeds.—*Eng. Cyc.*

(6261) PHILADELPHUS, a genus of plants the type of the natural order *Philadelphaceæ*, which is also the name of a tree, now unknown, mentioned by Athenæus, but was applied to the present genus by Bauhin. *Philadelphus* is characterised by having a calyx with an obovato-turbinate tube and a 4-5-partite limb. The greatest number of species are indigenous in North America, whence they have been introduced into the shrubberies of this country, to which they form a highly ornamental addition. A species has also been discovered in the Himalayas, at elevations of 6000 and 7000 feet, of which there are two varieties, sometimes considered distinct species, *P. tomentosus* being apparently only a more advanced state of *P. triflorus*. The best known species however is *P. coronarius*, commonly called Syringa, which is so easy of culture, and found in most gardens. It is supposed to be a native of the south of Europe, but it has hardly ever been found in a wild state, and even, in these few cases, it may have escaped from cultivation. As one species has been found in the Himalayas, there is no reason why other species should not exist still farther to the north-west, as in the Hindoo-Koosh, and that the Syringa may be found to be one of those plants which was in early times introduced from some part of the Persian Region of botanists into the south of Europe.—*Eng. Cyc.*

(6262) PHILADELPHUS CORONARIUS. PHILADELPHEÆ. A handsome shrub, producing white blossoms, having the appearance and smell of orange flowers; propagated by seed or layers.—*Riddell.*

(6263) PHILLYREA. Of this genus, Wight gives, *Paniculata* robusta, 1242; and terminalis affinis, 736.

(6264) PHILLYREA PANICULTA. OLEINÆ. A small tree with oblong ovate leaves; flowers in terminal panicles, pure white, bending down the branches, and giving the tree a graceful appearance. Introduced from China.—*Riddell.*

(6265) PHILOMELA, a genus of Birds belonging to the family *Sylviadæ*. *P. Luscinia* the Nightingale, is the most celebrated of the song-birds of the Old World. This well-known species is the 'Aηδων of the ancient Greeks; *Luscinia* of the Romans; Rossignuolo, Rusignuolo, and Usignuolo, of the Italians; Rossignol of the French; Ruisenor of the Spanish; Nachtigall of the Germans; Nachtegahl of the 'Fauna Suecica;' Nattergale of Brunnich; and Eos of the Welsh. It is the *Luscinia* of Gesner, Aldrovandus, Willughby, Ray, and Brehm; *Motacilla Luscinia* of Linnæus; *Sylvia Luscinia* of Latham and others; *Curruca Luscinia* of Fleming; and *Philomela Luscinia* of Selby, Gould, and Swainson. The following is a description of this bird:—Rich brown above; rump and tail with a reddish tinge; throat and middle part of belly dirty or grayish white: lateral parts of the neck, breast, and flanks, gray; bill and legs light brown. Sexes alike. The Nightingale shuns observation, abiding in the thickest coverts, and in these the nest is sometimes placed on a low fork, but generally on the ground. Withered leaves, particularly those of the oak, very loosely confined with dried bents and rushes, and lined internally with fine root-fibres, form the structure. The eggs, of an olive-brown, are four or five in number. After the young are hatched, generally in June, the melodious song of the male ceases, and is succeeded by a low croak, varied occasionally with a snapping noise; the first is considered to be meant for a warning, and the last as a defiance. The food consists, of insects, such as flies and spiders, moths and earwigs. Green caterpillars were the food brought by the parent birds to the nest of young nightingales taken by Colonel Montagu. It is not improbable that the bird's choice of localities is in some measure determined by the absence or presence of some favourite insect food. There is another European Nightingale (the Thrush Nightingale, *Philomela Turdoides* of Blyth, *Luscinia major* of Brisson, *Sylvia Philomela* of Bechstein) inhabiting central Europe. The song of this species is loud, but far inferior to that of the true Nightingale. It is said to be common in Egypt.—*Eng. Cyc.*

(6266) PHILYDRACEÆ, *Waterworts*, a natural order of Endogenous Plants, constituted by Brown to receive the genera *Philydrum* and *Hetæria*. They are allied, according to Lindley, to *Commelinaceæ*, *Orchidaceæ* and *Xyridaceæ*. The species are grassy-looking plants, with dipetalous flowers, no calyx, three stamens, of which two are abortive, and an embryo in the axis of a fleshy albumen; they have erect stems, and ensiform leaves. They are found in Australia, Cochin China. and China, (Lindley; *Vegetable Kingdom.*)—*Eng. Cyc.*

(6267) PHLOMIS INDICA. Linn.

Toombi keeray, Tam.
Toombikee baujee, Duk
Ghoomra, Hind.

Toombi koora, Tel.
Drona, Sans.

This green possesses a considerable degree of acrimony which the Natives temper by an admixture of some agreeable acid. "I am inclined to think that it is not a wholesome vegetable. Rumphius tells us that the acrid juice of the plant, which is called Dawn beran in Malays, the Woriahs in Amboyna squeeze into their eyes to nake them bold and intrepid in War. Vide Rumphius, From vi. p. 40.—*Ainslie's Mat. Med. age* 257.

(6268) PHLOMIS. Labiatæ. Phlomis Russelliana.—Jerusalem Sage.—These are perennial and shrubby plants, with coarse hairy eaves resembling the common sage; the flowers re purple, red, yellow, &c., growing readily from seed in any common soil.—*Riddell.*

(6269) PHLOX. Polemoniaceæ. Phlox Drummondii.—This is an elegant genus of plants, nd from their lively colours have a pretty appearance when grown in patches, the colours are ed, purple, lilac, white, &c., grow readily from eed in a light garden soil.—*Riddell,* Phlox Drummonda and variety Lepoldina are useul annuals, succeed well on the plains ither in pots or the flower beds, should e sown thinly, and when one or two nches high, transplanted where intended to ower, require in pots a somewhat loamy soil ell manured and drained. Native of Texas, ipens freely, which is to be preferred to that nported.—*Jaffrey.*

(6270) PHŒNICOPHAUS TRISTIS, Mahoka" of the natives, with a note like that f the English cuckoo, as heard late in the seaon.—*Hooker. Him. Jour. Vol.* 1. *p.* 27.

(6271) PHŒNIX, a genus of Palms, which as been so named from one of its species, e Date-tree, having been called so by the reeks: this name is thought by some to be deved from Phœnicia, because dates were proured from thence. The genus is common in ndia and in the north of Africa, and one of the pecies grows in Arabia, the lower parts of Persia nd along the Euphrates to Syria. The genus characterised by having flowers diœcious, sele in a branched spadix, supported by a simle spathe; calyx urceolate, 3-toothed; corolla -petalled; stamens 3 or 6; filaments very short, lmost wanting; anthers linear; (female) calyx rceolate, 3-toothed; corolla 3-petalled, with the etals convolute; pistil with three ovaries, distinct from each other, of which one only ripens; stigmas hooked; drupe 1-seeded; seeds marked on one side with a longitudinal furrow; albumen reticulate; embryo in the back of the seed; palms with stems of a moderate height and ringed, or marked with the seams of the fallen leaves; fronds or leaves pinnate; pinnæ or leaflets linear, with the spadix bursting among the leaves, surrounded with an almost woody 2-edged sheath; flowers yellowish-white; fruit soft, edible, of a reddish-yellow colour.—*Eng. Cyc.* Phœnix Palms, of which the date tree is at once the most important and popular representative, is a genus indigenous to Africa and Asia and embraces several species, the products of which are brought into the markets of India. Its trunk, marked with the scars of fallen leaves, is, in some species, so short that it hardly appears above ground. It is not decided whether the East Indian *P. sylvestris*, Roxb. be or not the *P. dactylifera* of Linnæus in a wild state.—*Seeman.*

P. dactylifera,—the Date-Palm is spread over the whole of Southern Europe, Northern Africa, and South-Eastern Asia, and its fruit is largely imported into India. It has many varieties but is a noble tree, from fifty to eighty feet high, and attaining the age of one hundred years.---*Seeman.*

(6272) PHŒNIX ACAULIS? Buch: the *Schaap* of the Lepchas is a small stemless palm which grows in Sikkim on the driest soil and in the deep valleys. The Lepchas eat the young seeds and use the feathery fronds as screens, when hunting.—*Hooker Vol.* I. *p*, 143. Phœnix Acaulis, a dwarf palm growing east of Siligoree in the Terai; a sure sign of a hungry soil.—*Hooker Him. Jour. Vol.* 1. *p.* 400.

(6273) PHŒNIX DACTYLIFERA. Date. Linn.

Payr-Eetchum pullum. Tam.
Payud K'hujoor, Duk.
Carjoora pundoo, Tel.
Temr, Arab.

Khurma, Pers.
Kehjoor, Hind.
Choorma, Malay.
Carjoora, Sans.

P. dactylifera, the Indian Date Tree, is common all over India, from thirty to forty feet high, and is one of the trees from which the *Toddy* or *Palm-wine* is drawn, the toddy being either drunk when fresh, boiled into sugar, fermented into an intoxicating fluid, or fermented for distillation into Arrack. Mats and baskets are made of the leaves.—*Seeman.* The Date-Tree, or Date-Palm, is one of the best known, and probably the earliest known of the palms, and though belonging to a family which abounds and flourishes most in tropical regions, itself attains perfection only in comparatively high latitudes. It is no doubt the species to which the name *Palma* was originally applied, as we may infer from its being common in Syria, Arabia, the lower parts of Persia, as well as Egypt and the North of Africa, whence it has been introduced into the south of Europe, and cultivated in a few places, not only as a curiosity, but on account of its leaves, which are sold twice in the year, in spring for Palm Sunday, and in September for the Jewish Passover; and also, from the name not being applicable to the other species known to the ancients, as it is considered that the bunches of dates were likened to the fingers of the hand, as appears from the present specific name *dactylifera*, from the Greek δακτυλος, a finger. It is the Palm-Tree of Scripture, and was emblematic of Judæa, as we see in coins with the inscription of *Judæa capta*. It is found in oases in the desert, and round Palmyra, which is supposed to have been named from its presence. This appears indeed to be only a translation of the Oriental name, which is Tadmore, supposed to be a corruption of Tamar (from 'Tamr,' a Date), a city built in the desert by Solomon. The date-Tree is therefore a subject of classical as well as of scriptural interest, besides its fruit forming a large portion of the food of a great part of the Arab race, and also a considerable article of commerce. The Date-Palm being diœcious, that is, the stamens and pistils, or the male and female parts being not only in different flowers, but even on different plants, the crops entirely fail, or the fruit is worthless and unfit for food if fertilisation is in any way prevented. To ensure this, the Arabs have long been in the habit of hanging the clusters of male flowers on the trees which bear only female ones, and therefore the Date-Tree is one of those which led to a knowledge of the sexes of plants. The extensive importance of the Date-Tree is, says Dr. Clarke, one of the most curious subjects to which a traveller can direct his attention. A considerable part of the inhabitants of Egypt, Arabia, and Persia subsist almost entirely on its fruit. They make a conserve of it with sugar, and even grind the hard stones in their hand-mills for their camels. In Barbary they form handsome beads for paternosters of these stones. From the leaves they make couches, baskets, bags, mats, brushes, and fly-traps; the trunk is split and used in small buildings, also for fences to gardens, and the stalks of the leaves for making cages for their poultry. The threads of the web-like integument at the bases of the leaves are twisted into ropes, which are employed in rigging small vessels. The sap is obtained by cutting off the head of the palm and scooping out a hollow in the top of the stem, where, in ascending, it lodges itself. Three or four quarts of sap may be obtained daily from a single palm, for ten days or a fortnight, after which the quantity lessens, until, at the end of six weeks or two months, the stem is exhausted, becomes dry, and is used for firewood. This liquor is sweetish when first collected, and may be drunk as a mild beverage, but fermentation soon takes place, and a spirit is produced, which is distilled, and forms one of the kinds of aruk (arrack), or spirit of eastern countries. Such being the importance and multiplied uses of the Date-Tree, it is not surprising that in an arid and barren country it should form so prominent a subject of allusion and description in the works of Arab authors, and that it should be said to have 300 names in their language. Many of these are however applied to different parts of the plant, as well as to these at different ages.—*Eng. Cyc.* The true DATE TREE (*Phœnix dactylifera*), the Palm tree of Scripture, flourishes in comparatively high latitudes, and is well known to afford the principal article of food the natives of Arabia and of the North of Africa: while the leaves are employed in making mats, baskets, &c.; and at Cairo cordage is made of fibres obtained from the footstalks of the leaves. Though the tree grows well in India, it does not there produce any edible dates; but *Phœnix sylvestris*, the *Kujjoor*, of India, which closely resembles the former in character, is found in every part of that country, near Madras, in Mysore in Bengal and the North-West provinces up into the Punjab. This tree is especially valued in many places as its sap or Palm juice (*tari*) is either drank fresh from the tree, or fermented for distillation, when it yields a common kind of spirit or *aruk*. In Bengal it is valuable as yielding a considerable quantity of the sugar produced in that province, and known as Date sugar. Each tree, "on an average, yields 180 pints of juice, of which, every twelve pints are boiled down to one of *goor* or *jaguri*, and four of goor yield one of good powder sugar; so that the average produce of each tree is about seven or eight pounds of sugar annually." (Roxburgh.) The leaves are very generally employed for making mats and baskets and also bags in Bengal. The footstalks of the leaves are beaten and twisted into ropes, which are employed for drawing water from the wells in Bellary and other places. One species of *Phœnix* (*P. paludosa*); the *Hintal* of Bengal abounds in the Sooonderbunds while another *P. farinifera* common on dry, barren, sandy lands on the coast, and on the hilly country between the Ganges and Cape Comorin. Its stem abounds in farinaceous matter, which the natives make use of as food in times of scarcity. The leaflets are wrought into mats for sleeping on. The common footstalks of the leaves are split into three or four, and made into baskets of various kinds.—*Fib. Pl. p.* 96. In Tenasserim, Mr. Mason has seen young date trees raised from the seeds of the dried dates that are imported, and there is no apparent reason why the tree might not be cultivated. The dates that grow in India are of a very inferior quality to those brought from Persia and Arabia. The finest Arabian date swe are told by Dr Herbelot, come from a town called Hagiar in the province of Bahrain.—*Mason. Ainslie. p.* 30.

(6274) PHŒNIX FARINIFERA. Is a

dwarf species. The fruit ripens in May, and a species of sago is procured from the trunk, which is split and dried, and then beat in wooden mortars until the farinaceous parts are detached.—*Jaffrey.* It is a native of dry ground or sandy hills, not far from the sea on the Coromandel Coast. It flowers in January and February, and the fruit ripens in May. The leaflets are wrought into mats for sleeping on, and the common petioles are split into three or four, and are used for making baskets. The small trunk is generally about 15 or 18 inches long, and about 6 inches in diameter. It incloses in its substance a large quantity of farinaceous matter, which the natives use for food in times of scarcity. To procure this meal, the small trunk is split into six or eight pieces, and dried and beaten on wooden mortars till the farinaceous part is detached from the fibres; it is then sifted, to separate them; the meal is then fit for use. The only further preparation which this meal undergoes is the boiling it into a thick gruel, or conji. It seems to possess less nourishment than common sago, which is obtained in a similar manner from another palm, and is less palatable when boiled, but it has saved many lives in times of scarcity.—*Eng. Cyc.* Seeman tells us it is a dwarf plant, the trunk about one or two feet high, and so enveloped in the leaves as to appear like a bush. It is common on the peninsula of India, on dry barren sandy ground. Its leaflets are wrought into sleeping mats. The common petioles are split into three or four, and used to make baskets of various kinds. The exterior or woody part of the trunk consist of white fibres matted together, these envelope a large quantity of farinaceous substance which the natives use for food in times of scarcity. To procure this meal, the small trunk is split into six or eight pieces, dried, and beaten in wooden mortars, till the farinaceous part is detached from the fibres; and the meal, when separated by sifting, is fit for use, by being boiled into a thick gruel or conjee. It is, in fact, an inferior sago.—*Seeman.*

(6275) PHŒNIX PALUDOSA. Roxb. The marshdate palm. This dwarf palm, grows plentifully on the Sunderbuns, South of Calcutta. *Hooker Him. Jour. Vol.* I. *p.* 1. On the low islands in the rivers, and on the shores which are inundated with the highest tides, the marshdate palm abounds, a small tree about twenty feet high, no thicker than a walking cane; whose fruit looks precisely like a bunch of dates, but it is not edible. Griffith says: "It is well worth cultivating on account of its elegance, and its being adapted for bank scenery."—*Mason.* P. paludosa, is the most Southern Indian species of the phœnix palms, and its elegant impenetrable tufts, well adapt it for bank scenery. The trunks of the smaller trees serve for walking sticks, the long trunks for rafters and the leaves for thatch.—*Seeman.*

(6276) PHŒNIX SYLVESTRIS. Eetcha wood Tree.

Eetcha marum, Tam.

Phœnix sylvestris. Capt. Phayre informed Mr. Mason that he saw a wild date palm near one of the kyoungs in Amherst province; but though so abundant on the Hoogly, this is the only one he ever heard of in the Provinces.—*Mason.* Phœnix Sylvestris is a species common in the arid parts of India, and there commonly called Khujjoor by the natives, and the Date-Tree by Europeans, which it resembles in appearance. In its parts of fructification it is like P. farinifera, but differs in growing to be a tree, with a tall pretty thick trunk and large yellowish or reddish fruit. It yields Tarri, or palm wine, commonly called Toddy. The mode of obtaining this is by removing the lower leaves and their sheaths, and cutting a notch into the centre of the tree near the top, from which the liquor issues, and is conducted by a small channel, made by a bit of the palmyra-tree leaf, into a pot suspended to receive it. This juice is either drank fresh from the tree, or boiled down into sugar, or fermented for distillation when it gives out a large portion of spirit, called Aruk. Mats and baskets are made of the leaves. Sugar has always been made from this species, and accounts of it have been given by Drs. Roxburgh and Buchanan Hamilton. Date-sugar is not so much esteemed in India as that of the cane, and sells for about one-fourth less. It has sometimes been imported in considerable quantities into England, but is not distinguished from the cane sugar. Dr. Roxburgh calculated, 40 years ago, that about 100,000 lbs. were made annually in all Bengal. At the age of 7 or 10 years, when the trunk of the tree is about 4 feet high, it begins to yield juice, and continues productive for 20, or 25 years. The juice is extracted during the months of November, December, January, and February, during which period each tree is reckoned to yield from 120 to 240 pints of juice, averaging 180 pints. Every 12 pints, or pounds, is boiled down to one of goor, or jagari, and four of goor yield one of good sugar in powder, so that the average produce of each tree is about 7 or 8 lbs. of sugar annually.—*Eng. Cyc.* This tree grows all over East India, but it is said to do best on the sea coast. It produces 8 to 10 lbs. of sugar, and even 12 lbs. per tree.—*Bonynge, America, page* 143.

(6277) PHOLADIDÆ, a family of Conchiferous *Mollusca*, embracing the genera *Pholas, Pholadidea, Xylophaga,* and *Teredo.* The *Pholadidæ* perforate all substances that are softer than their own valves. The burrows of *Pholas* are vertical, quite symmetrical, and seldom in contact. The Ship-Worms (Teredines) also make symmetrical perforations, and, however tortuous and crowded, never invade each other, guided either by the sense of hearing or by the yielding of the wood. The burrow has frequently a calcareous lining, within which the shell remains free. *Teredina* cements its valves to this tube when full grown; the opening of the burrow, at first very minute, may become enlarged progressively by the friction of the syphons, which are furnished with a rough epithelium, but it usually widens with much more rapidity by the wasting of the surface. As the timber decomposes the shelly tubes of the *Teredo* project; and as the beach wears away the *Pholas* burrows deeper. (Woodward.) The number of living species of *Pholas* noted by Mr. Deshayes in his Tables is 15, and of these one, *P. candida*, is recorded as living and fossil Woodward, in his Manual of the Mollusca, gives 25 recent species of *Pholas* and 25 fossil. Forbes and Hanley give the following as British species:—*P. dactylus*, *P. parva*, *P. crispata*, *P. candida*, *Xylophaga dorsalis*, *Pholadidea papyracea*.

(6278) PHOLAS. Animal more or less thick and elongated rarely shortened.

(6279) *Teredo* is the name given by Linnæus to a genus of Testaceous Molluscs, highly interesting on account of the ravages which one of the species commits upon submerged wood. Linnæus, in the twelfth edition of the 'Systema naturæ,' placed the genus among his *Vermes Testacea*, between *Serpula* and *Sabella*. Cuvier, in his last edition of the 'Regne Animal,' makes *Teredo* one of the genera of his Enfermes, the fifth family of his Acephalous Testaceans, arranging the genus between *Pholas* and *Fistulana*.—*Eng Cyc.*

(6280) PHOLIDOTA ARTICULATA. In the suburbs of Maulmain, a white flowered species of pholidota is not rare.—*Mason.*

(6281) PHOOL-EL-KA-TEL, an odoriferous oil made by placing sweet scented flowers, in three or five successive patches, over gingelly oil seed, and then expressing the oil. The best is made at Gingi, and is sold at 1½ rupee for two pounds.—*Herklots.*

(6282) PHOOT. CUCUMIS MOMORDICA.—Field Cucumber. A wild species of cucumber sown generally in the fields amongst Jaworie, and is something between the melon and cucumber; it keeps for a long time if not too ripe and would be valuable as a store vegetable for sea.—*Riddell.*

(6283) PHORMIUM, a genus of Plants of the natural family of *Liliaceæ*, tribe *Agapantheæ* of Endlicher, *Asparageæ* of Lindley, contains only a single species, which is remarkable for its useful product, so well known under the name of New Zealand Flax, and which is found indigenous in New Zealand and Norfolk Island.—*Eng. Cyc.*

(6284) PHORMIUM TENAX has a coloured tubular perianth, of which the tube is very short, and divides into six segments, of which the three inner are the longest; stamens six, inserted into the base of the tube, ascending, exserted; capsule oblong, 3-cornered: seeds numerous, compressed; embryo in the centre of the seed, longer than half the albumen, with its radicle next the umbilicus. The root is tuberous, fleshy, and bitter tasted; the leaves are numerous, all radical, linear-lanceolate, five or six feet long, and from an inch and a half to two inches broad, 2-rowed, equitant at the base, leathery, and very tough. Its flowers are numerous, showy, yellow-coloured, arranged on a tall branched panicle. The leaves of this plant yield a very beautiful and a very strong fibre, which has been imported in considerable quantities under the name of New Zealand Flax. It was expected to be much more useful than it has proved to be, in consequence of its having the defect of breaking easily when made into a knot. Being a plant of high southern latitudes, it was supposed that it might easily be grown in different parts of Europe. The French have attempted to cultivate it near Cherbourg, Toulon, and other places, and it has been introduced into Ireland, the moist insular climate of which is probably favourable to its growth. It grew remarkably well for a number of years in the Chelsea Botanic Garden, but was killed by the severe winter of 1837-38. Its cultivaton has also been attempted in Australia, but has not yet succeeded to any extent.—*Eng. Cyc.*

New Zealand Flax (*Phormium tenax*)—was discovered by the celebrated Cook in New Zealand—as he says "the country produced a grass plant, like flags, of the nature of hemp or flax, but superior in quality to either; of this the natives make clothing, lines, nets, &c." It grows both on the north and the south coast. It was introduced in the year 1798 into the south of Ireland, and has been found to flourish on the west coast of Scotland, though European winters are occasionally too severe for it. The native name of the plant is *koradi* or *korere*, while the fibre is called *muka*. The leaves of the plant are perennial, hard, sword shaped, from five to seven feet in length, with a flower-stalk rising four or five feet above them, and bearing a profusion of yellow flowers, followed by triangular seed-vessels, filled with flat and thin black shining seeds. According to Salisbury, three-year old plants yield on an average, thirty-six leaves, beside offsets from the roots. Six leaves produced one ounce weight of dry fibres, after being scutched and cleaned; and he calculated that an acre cropped with these plants, three feet apart (but they could not be placed so near without interfering with each other), will yield more than sixteen cwt. "The leaves are cut when full-grown, macerated in water for a few days, and then passed under a weighted roller." The natives of New Zealand cut the leaves when full-grown, and separate the fibres while yet green. Mr. G. Bennett states that a lateral incision is made with a large shell on each side of the leaf, merely to cut through the epidermis, which is first removed, and then, what he calls the internal epidermis, probably a part of the cellular tissue, "which agglutinates the fibres, and, if not removed, deteriorates the flax." The principal operation is scraping with the shell, and then separating the fibres with the thumb-nails, and then employing combs for a more minute separation. The fibres are subsequently dried in the sun, and are perfectly white; some stout and strong, others fine and silky. It is said that "the plant may be shorn of its leaves in the morning, and before the sun has set be ready for weaving into cloth." The same thing may, no doubt, be done with others of these naturally white endogenous fibres. Considerable quantities were at one time imported, and a factory was established by Capt. Harris for their manufacture, but the supply seems to have been irregular, and now to have fallen off rather than increased. Mr. J. Wood, in the year 1844, in a communication to the Agricultural Society of India, called attention to the New Zealand Hemp, as a plant which was very hardy and would thrive in any soil or climate, but that it preferred swampy lands. He stated that it was often met with in New Zealand, thriving three or four feet under sea-water, (but t is also found at some distance from the seashore). He therefore thought the locality of the Soonderbunds, extending from near Calcutta to the sea, to be well adapted for this plant; and which would be profitable in a country where labour was so cheap. But it seems to have been forgotten, in this, as well as in a paper in the first volume of the 'Transactions of the Society,' that a plant which flourishes so far south as New Zealand, and succeeds well both in Scotland and in Ireland, is not likely to do well in so tropical a situation as that of the Soonderbunds. An interesting set of specimens of New Zealand Flax, showing the native method of preparing the fibre and of dyeing it black, were sent to the Exhibition of 1851, by Taohui, a New Zealand chief; and another, a very valuable and suggestive set of specimens of the fibre and its tow, by Mr. E. W. Trent (v. 'Illust. Col.,' xli, p. 187), which he described as having been separated entirely by machinery invented by himself. If this fibre can be so prepared, then it is evident that others of the same nature may be successfully treated in a similar manner. These fibres are applicable to a variety of purposes, either of a textile nature or for cordage, and will, like the other white fibres we have mentioned, take colour. The strength of the fibres is considerable, for in some experiments by De Candolle, in which, however, that of Agave is understated, there is no doubt that the New Zealand Flax, which bore 23·7, was stronger than either Flax or Hemp, which bore respectively $11\frac{3}{4}$ and $16\frac{3}{4}$. It has also the advantage of being lighter, but has the disadvantage of many of the white fibres of breaking at a knot. Mr. J. Murray, in his pamphlet on this plant, printed on paper made from its leaves, states that the ship Atalanta, which plied between Southampton and the Channel Islands, was completely equipped with cordage and rigging made of *Phormium tenax*. He further continues—"I have seen specimens of ropes, twine, yarn, lines, sailcloth, sacking, bedtick, &c., made of *Phormium tenax*, also fine fabrics of various kinds, affording demonstrable evidence that its fibre is susceptible of being woven into tissues of the most delicate description, or manufactured into materials of the strongest and coarsest kind. The sails, cables, and running rigging of the beautiful model of the frigate presented by his late Majesty William the Fourth to the King of Prussia, were entirely formed of *Phormium tenax*. Capt. Harris's yacht, a perfect gem in naval architecture, was supplied with a mainsail composed of three different varieties of New Zealand flax, and the cordage made of *Musa textilis*," that is, of Manilla hemp, of which we have before treated.—*Royle. Fib. Pl.*

(6285) PHOTINIA GLABRA, is common in China and ornamental. It is a noble evergreen, which in the winter becomes covered with bunches of red berries.—*A Res. among the Chi. p.* 51.

(6286) PHOTINIA SERRATIFOLIA.

Donkyat, BURM.

Found in the neighbourhood of Rangoon and along the banks of the streams in the Rangoon districts, in the direction of the Teak forests. Redwood, adapted to cabinet making.—*McClelland.* The leaves of this plant are used for a green dye.—*McClelland.*

(6287) PHRAGMITES, a genus of Plants belonging to the natural order *Graminaceæ*. *P. communis*, the Reed, is a plant formerly regarded as a species of *Arundo*, but now separated from that genus on account of its lower floret being male while the others are hermaphrodite, and its rachis being fringed with long silky hairs. It is a tall plant with annual stems and a perennial root and is found exclusively in places overflowed even during summer. In such situations it is found abundantly in Great Britain, and occurs all through Europe, is common in Siberia, Japan, North America, and even Australia, forming thick coverts, and yielding an abundance of stout durable grass of great value for the purpose of thatching the roofs of buildings. This is undoubtedly the φραγμίτης of the Greeks. A second species is said to grow in Egypt, and a third in the island of Mauritius; the two latter species are however little known.—*Eng. Cyc.*

(6288) PHRYNIUM DICHOTOMUM.

Theen, Burm.

Very plentiful in the forests of the Pegu and Tounghoo districts. It is said to afford a strong fibre.—*McClelland.*

(6289) PHYLLANTHUS. Of this genus of plants Dr. Wight gives bacciformis, 1893; leprocarpus, 1895; Madraspatensis, 1895; multiflorus, 1901; myrtifolius, 1902; Niruri, 1894; polyphyllus, 1895; rhamnoides, 1895-98-1900; Rheedii, 1895; scandens, 1895-99; tetrandrus, 1900-1902-1903; turbinatus, 1897; vitis idœa, 1298-1900.

(6290) PHYLLANTHUS. There is a small tree very abundant at Maulmain, and in many other localities on the Tenasserim Coast, belonging to the genus phyllanthus which bears a small intensely sour fruit, that is valued by the natives.—*Mason.*

(6291) PHYLLANTHUS EMBLICA, Linn. Emblic myrobalan.

Oosarica, Tel.	Topoo nellee, Tam.
Aola, Anola, Hind.	Awla or Aunlee, Duk.

This grows to a pretty large tree and is cultivated throughout most parts of India, and is found wild throughout the Concan and Deccan. —*Riddell.* The tree is cultivated at Ajmeer, but grows wild in Kotah and Mewar.—*Genl. Med. Top. p.* 208.

The Flower.

Nelliepoo, Tam.	Woosheri ke poo, Tel.
Aoonli ka pool, Duk.	Amalaka, Sans.
Vurdi Amludge, Arab.	

This flower is supposed to be cooling and gently aperient, and is prescribed in conjunction with other articles in the form of electuary.—*Ains. Mat. Med. p.* 94.

The Fruit.

Nellie pullum, Tam.	Aunleh, Pers.
Aoonla ka pull, Duk.	Aunwera, Hind.
Amluj, Arab.	Woosherikaia, Tel.

Anola, Aola, Phyllanthus Emblica. Emblic Myrobalan. The fruit is brought from Kotah and Mewar. It is used abundantly fresh or dried as a condiment, being pickled also; and in dyeing, and to wash the hair with; the fruit is very acid and astringent, and contains gallic acid. The use of this fruit was supposed beneficial as an adjuvant in treating the scurvy at Nusseerabad.—*Gen. Med. Top. p.* 124 & 208. The fruit resembles the gooseberry, having a sharp acid juice, and is eaten raw by the natives, and is sometimes made into preserves; the bark is strongly astringent and is used for tanning leather.—*Riddell.*

(6292) PHYLLANTHUS LONGIFOLIUS.

Cheera mella, Hind.	Hurporori, Duk.

A small tree, commonly cultivated for the sake of its fruit, which is the size of a large gooseberry; it is more esteemed by the Europeans than the Emblica, and is used both as a pickle and preserve—*Riddell.* In Ajmeer, in gardens, but wild in Kotah, the acid berry is eaten.—*Med. Top. p.* 208.

(6293) PHYLLANTHUS MULTIFLORUS, Phyllanthus, many flowered, Bark of. Willd.

Poola Puttay, Tam.

This bark, which is also called Neerpoola Puttay, from the plant growing near water, is occasionally employed by the Natives of India in the process of dyeing reddish brown.—*Ains. Mat. Med. p.* 191.

(6294) PHYLLANTHUS NIRURI, Native of the East Indies.

Sadee hazur munee, Hind. and Beng.	Nella userekee, Tel.

A common weed, according to many writers; the root is bitter and astringent, and a powerful diuretic. *P. urinaria*, (hazar munee. yerra userekee,) East Indies and Bourbon, is of similar properties, and used in several maladies; flowers sessile, capsules dull, scabrous, young plants deeply dark red.—*O'Shaughnessy, page* 551.

(6295) PHYLLANTHUS SIMPLEX, Retz. Roxb. iii. p. 654.

Oochie userekee, Tel.

Fresh leaves, flowers, and fruit, with cummin seeds and sugar are made into an electuary, and given by the natives as a remedy for gonorrhœa; fresh leaves bruised with buttermilk are used to cure the itch. *Roxb.—O'Shaughnessy, page* 552.

(6296) PHYLLANTHUS VIROSUS. Up among the Circar mountains, where this chiefly grows, it is frequently a middle sized tree In the forests of the low countries it is much smaller or only a large shrub. It flowers during the hot and beginning the wet season. The bark is a strong astringent and possesses the power of intoxicating fish, when thrown into the water where they are, which, like the berries of Menospermum cocculus, renders them easily taken.—*Roxb.* from *Rohde M. S. S.*

(6297) PHYLLANTHUS VITIS IDŒA.

Khaton Nirouri, Rheed.	Yerrapooroogoodoo, Tel.
Humkata jooli, Beng.	

This is one of the most common of the family. It is found wild in every part of India, and seems to thrive well in all soils and situations, but amongst the mountains, it grows to be a tree; where as in the low lands, it is generally a large shrub. It flowers and produces fruit all the year round. The wood is white hard and durable. The hill people employ it for various economical uses. Cattle eat the leaves. In drying for the hortus siccus they always become very black ; it is frequently employed for ornamental hedges in gardens for which end it is well chosen, as its thick evergreen foliage and constant succession of beautiful red berries gives it a pretty appearance. *Roxb.—Rohde M.S.S.*

(6298) PHYLLODOCE, a genus of Plants belonging to the natural order *Ericaceæ*. It has a 5-parted calyx, an ovate corolla with a contracted 5-toothed mouth, 10 stamens inclosed, slender glabrous filaments longer than the anthers, short truncate cells opening by pores at the apex. The seeds are compressed and shining. The species are small evergreen shrubs, natives of the North of Europe, Asia, and North America.—*Eng. Cyc.*

(6299) PHYLLOPODA, (Latreille), a section of Entomostracous *Crustacea*, [ENTOMOSTRACA]. —*Eng. Cyc.*

(6300) PHYLLOSOMA, a family of *Crustacea*, called by Milne-Edwards Double-Cuirassed (Bicuirasses). It is composed of forms which are very remarkable for their rounded shape and the transparency of their teguments. The species are found in the seas of warm countries. M. Milne-Edwards remarks, that were it not for the beautiful blue of their eyes, they would not be perceived as they float on the surface of the water, so transparent are their bodies. The seas of Africa and India, Australia and New Guinea furnish the greatest number of species. M. Milne Edwards divides the genus into three natural groups.—*Eng. Cyc.*

(6301) *Phyllosoma commune*, has the cephalic plate less than the thoracic plate, covering the base of the second pair of feet (or external jaw-feet); elongated, and narrowed forwards. It inhabits the seas of Africa and India.—*Eng. Cyc.*

(6302) *Phyllosoma clavicorne*, from the seas of Africa and Asia, is another example of this section.—*Eng. Cyc.*

(6303) *Amphion Rehnaudii*, the only species known, was taken at Sea in the Indian ocean, by *M. Reynaud*, naval surgeon. Its length is about an inch ; and its teguments, with the exception of those of the abdomen, are diaphanous. —*Eng. Cyc.*

(6304) PHYSALIS (from φῦσα, a bladder, in reference to the inflated calyx), a genus of Plants, belonging to the natural order *Solanaceæ*. It has a 5-toothed calyx ; a campanulate rotate 5-lobed corolla; converging anthers opening ongitudinally ; a capitate stigma ; smooth 2-celled berry, covered with the angular membranous inflated calyx. The species are annual or perennial herbs, rarely shrubs.—*Eng. Cyc.*

(6305) PHYSALIS ALKEKENGI, the Winter Cherry, is an herbaceous downy plant, with a perennial creeping root ; ovate deltoid leaves ; spotless flowers, ovate coloured calyx, and subulate segments. It is a native of Europe on exposed hills, and of Japan. The corolla is a dirty white ; the calyx reddish-yellow, inclosing a red berry. The fruit of this plant was well known to the ancients, and is described by Dioscorides. In England however the fruit is seldom eaten, and the plant is cultivated chiefly on account of its appearance. In Arabia and Armenia, Spain, and Germany however the berries frequently supply the place of other eatable fruits. They have a subacrid and not unpleasant flavour, but the persistent calyx with which they are invested is very bitter. Ray speaks of these berries as a preventive of gout, and others have extolled them as diuretics, and recommended them in the treatment of dropsy.—*Eng. Cyc.* The Physalis Alkekengi, having some repute as a febrifuge, M.M. Dessaignes and Chantard analysed it, and succeeded in procuring a bitter substance, which they have called Physaline, forming a light white powder with a very slight shade of yellow, leaving in the mouth after a time a very marked taste of bitterness. This substance does not seem to have been used medicinally, nor has its value, if any, been ascertained. Were it otherwise it might be well to examine Physalis flexuosa of this country, used in native medicine as stimulent and diaphoretic.—*Ind. Ann. Med. Sci. for Apl.* 1856. *p.* 384. Honigberger, *p.* 324, tells us that its fruit (Halicacabum), the winter cherry, is what the Easterns call Kagnuj. The English have given the name of Kagnuj to the Physalis flexuosa or somnifera, as this is the name of the plant in the lower parts of Hindostan, in Bengal? The winter-cherry is used by the Hakims as a diuretic, and in ulceration of the urinary bladder. It is said to be purgative and is much used in veterinary medicine. The winter-cherry has long been abandoned in European practice and is now regarded as useless.—*Honigberger.*

(6306) PHYSALIS ANGULATA. COUNTRY GOOSEBERRY, OR WINTER CHERRY. Linn.

Takalie pullum, TAM.
Poplah, DUK.
Jouzul nurnj, ARAB.
Kaknuj, PERS.
Takkali pundoo. TEL.
Agnimunda, SANS.

This has got the name of country Gooseberry in India, from its resemblance in taste to that fruit : it is the produce of a small bush which has been called by Botanists, "The tooth leaved Winter Cherry," and is of the class Pentandria and order Monogynia.—*Ainslie, p.* 233.

(6307) PHYSALIS FLEXUOSA, as also Physalis somnifera, grows among the ruins of the old city of Lahore. The Punjabees call the plant *agsend* not as stated by so many authors as also in the Bengal Dispensatory, *Asgend.* Asgend

(Usgund) *Nagowri*, is a root officinal with the native doctors in the Punjab, and is imported from Hindostan. The seeds used by Honigberger under the name Physalis flexuosa semina, were not the seeds of the Lahore plant, but had been imported from Mooltan. They are kept by the druggists, who call them *Penir ke. big*. Piddington states that *Peneru* is Physalis flexuosa. Penir is the Persian name of cheese, and as these seeds are employed in the coagulation of milk for making cheese, the derivation of its name is palpable. The plant which yields these seeds grows on the west side of the Indus river. The leaves which are very bitter, are used as an infusion by the Loanis in fever. Galium verum, Linn, was formerly used in Europe for the coagulation of milk. Its flowers are yellow, those of Peniru not known. The fruit of Physalis flexuosa is accounted diuretic, and the root and leaves powerfully narcotic, the latter are used in India as a poultice to inflamed tumors.—*Honigberger*, *p*. 324.

Common at Ajmeer the roots are sold by punsaris, and are considered stimulating and diaphoretic.—*Gen. Med. Top. p.* 183.

(6308) PHYSALIS PERUVIANA.

Tapureea, Hind.

The Winter Cherry. This plant, commonly called Cape Goosberry or Brazil Cherry, grows luxuriantly in a good soil. The seed should be sown at the commencement of the rains. The young plants when about six inches high should be set out in rows at least two feet apart from each other, sufficiently wide apart, in fact, to allow the gardener to pass easily betwcen them. They may be grown either on sticks or on trellis, and should be carefully pruned. The young shoots bear the finest fruit, and if carefully attended to, will bear almost all the year round,—the excellence and abundance of the fruit well repaying for any extra care bestowed on the cultivation of the plant. Being of easy culture, it is hardly known to what a state of improvement this apparently worthless fruit may be brought. Produced under an improved method of cultivation, it is a most wholesome and useful fruit; none more so for tarts, or even for dessert, and for making jam or preserve. After seeing the common fruit, grown without care or attention, one would scarcely credit the size of that produced under proper and careful management. The bush should every now and then be carefully pruned, cutting out the old wood, as the new shoots provide the finest flavored fruit.—*Riddell*.

(6309) PHYSALIS PUBESCENS, Downy Winter Cherry, is a native of North America and the East Indies. The whole plant is densely clothed with down. The corolla is yellow marked with five roundish brownish-violet spots at the throat. The berries are yellowish when ripe; they are called Gooseberries, and are used as a substitute for them in many parts, and when preserved with sugar make an excellent sweetmeat. It is the Camara of Brazil.—*Eng. Cyc.* Cultivated in Ajmere gardens for the fruit.—*Genl. Med. Top. p.* 183. "Brazil gooseberry," is occasionally seen in Tenasserim gardens.—*Mason.*

(6310) PHYSALIS. SOMNIFERA. *Syn.* P. FLEXUOSA. Roxb. Fl. Ind. i.

Usgund, also Kakunj, Hind.	Amookanam (root): also Amkootang kalung, Tam.

A native of rocky places on the sea coast of the south of Europe and the East.—*O'Shaughnessy*. *Physalis somnifera*, has several shrubby branched stems, round and downy. The leaves are in lateral pairs, short-stalked, ovate, downy, and from two to four inches long. The flowers are axillary, subsessile, small, crowded, and of a greenish-yellow or white. The berry is red and smooth, and about the size of a pea. This plant is the Στρύχνοςὑπνωτικὸς of Theophrastus ('Hist. Plant.,' 9, 12); and the Στρύχνον αλικάκαβον of Dioscorides (4, 72). It is a native of rocky places in the south of Europe and the East Indies. It is reputed to be narcotic, diuretic, and alexipharmic. The leaves steeped in oil are in India applied to inflammatory tumours, and they are used in a similar way in Egypt. Kunth recognised this plant in Egyptian mummies.—*Eng. Cyc.*

(6311) PHYSOLOBIUM. Leguminosæ.—These plants are not much known. They are natives of the Swan River, and take their name from Physa, a bladder, and lobos, a pod, alluding to the shape of the seed vessels.—*Riddell.*

(6312) PHYTELEPHAS (from φυτόν, a plant, and ἐλέφας, ivory), a genus of Plants belonging to the natural order *Pandaneæ*, of Brown, and originally referred by Lindley to the order *Cyclanthaceæ*, but in his 'Vegetable Kingdom' he places it with the Palms. Under this name it was first described by Ruiz and Pavon, in their 'Systema Vegetabilium Floræ Peruvianæ.' It was also described by Willdenow under the name *Elephantusia*, but the former name is now generally used. The substance called Vegetable Ivory consists of the seeds of species of *Phytelephas*. This genus is characterised by possessing pinnated fronds and an erect stem. The flowers are arranged on a spadix inclosed in a universa spathe, and are of two sorts, the one containing both stamens and pistils, the others only pistils. The spadix is crowded with flowers, and the stamens are very various; the style is divided into 5 or 6 deep segments; there is no visible caly or corolla; the fruit consists of quadrilocular drupes, which are aggregated into a large muricated coriaceous head. The seeds are about the size of a pigeon's egg, and of an oblong-ovate triangular shape. When young, they contain a crystalline liquor without odour or taste, which is regarded as a refreshing drink by travellers. In the process of growth however this once opaline liquid becomes milky and opaque, acquiring some taste and odour, and at last it is converted nto a substance in many instances whiter and harder than ivory. If the liquid of the seed is kept long, even when it is clear, it becomes sour, thus indicating that although clear and tasteless t contains some carbonaceous principle, as well s water. There are two species of *Phytelephas*, ielding seeds of the same kind: the *P. Macrocarpa* has a low stem and large fruit, whilst the P. *microcarpa* has little or no stem and small ruit. These plants, which have an external haracter something between a palm and a cycas, ccur in South America, in the valleys of the Peruvian Andes, and especially on the borders f the river Magdalena. The natives of these istricts have used the seeds from time imme- torial, for the purposes of making buttons, eads to walking-sticks, and various trinkets; ut it is only within a recent period that they ave been used for such purposes in Europe. hey are now extensively so, as far as their ize will permit them, for the manufacture f almost all the articles for which ivory had een in use before; and, as they can be ade at a cheaper rate, their sale is at present mewhat extensive. In the use of the nuts for rning, considerable difference is found in their uality; some are comparatively oily and soft, d work up with ease, whilst others are so rittle as to be unmanageable in the lathe. They not answer so well as ivory for the construc- on of delicate articles, as they are much more sily fractured; and although at first these seeds e whiter than ivory, they are not found to re- in their colour so well. It might at first ap- ar difficult to account for the germination of ese plants, as the albumen, which is destined nourish the young plant, is as hard as ivory; t this is provided against by the hard albu- en absorbing water, and thus not only becom- g soft and capable of being used by the embryo, t it also loses its whiteness. It regains these operties when dry. The embryo is small com- red with the size of the seed, of a sweet taste, d lies inclosed in a little bag at one end of the ed, the presence of which is indicated by a ght swelling on the external part of the seed. hen the seeds are brought into England ey are contained in a soft external tegument of ight colour, and about the eighth of an inch in ickness, with a dark mark indicating the point attachment. This covering is easily removed, d the seed underneath is of a dark brown lour, from a membrane which is closely at ched to the albumen. In some cases this is of a ddish colour, especially on the smaller seeds, and these are probably the produce of the smaller species of the plants. When the seed is cut completely through, an irregular cavity is found in the centre. This should be attended to in working it. (Ruiz and Pavon, *Systema Vegetabilium Floræ Peruvianae*; Cooper, Paper *On Vegetable Ivory;* in *Microscopical Journal*, No. 16.)—*Eng. Cyc.*

(6313) PHYTOLACCA, a genus of Plants the type of the natural order *Phytolaccaceæ.*—*Eng. Cyc.*

(6314) PHYTOLACCA ACINOSA. Roxburgh describes a *Phytolacca acinosa* obtained from Nipal, where the leaves are eaten after boiling, as is the case with the American species described below. It flowers in the Botanic Garden of Calcutta about the end of the cold season, and certainly demands careful trial.—*O'Shaughnessy, page* 527.

(6315) PHYTOLACCA DECANDRA. Poke weed, North America. Bigelow states that in emetic properties the root is very nearly equal to Ipecachuana, its use is however sometimes attended with slight narcotic symptoms. It is also used as an external application in itch, and tinea capitis.—*O'Shaughnessy, page* 527.

(6316) PHYTOLACCA ICOSANDRA. An herbaceous plant; leaves alternate, entire, without stipules; flowers racemose. A tincture from the ripe berries has the reputation of being a remedy for chronic rheumatism and syphilitic pain.—*Riddell.*

(6317) PIACABA. ATTALEA FUNIFERA. A most valuable palm, found in the native forests of the maritime provinces of Brazil, the fibres of its leaf stalks and other parts furnishes the best Cordage of South America.—*Seeman.* A coarse black fibre is obtained from the dilated base of the petioles. It is collected by the natives, and partly used for home consumption, partly exported to Europe, tied up in bundles of several feet in length, and sold in London under this name at about £ 14 the ton. It is manufactured into cordage in its native countries, and as it is light, cables made of it do not sink in the water. —*Seeman.*

(6318) PICIDÆ, a family of Scansorial Birds. The order *Picae* of Linnæus is thus characterised:—Bill (cuneus sarriens) cultrated, with a convex back. Feet walking, short, rather strong. Body 'tenacinsculum,' impure. Food 'quisquiliæ.' Nest in trees; the male feeding the incubating female. Monogamy. Order analogous to the *Primates.*

The following is Mr. Swainson's systematic arrangement:—

Picidæ.—Bill straight, more or less conic. Toes placed in pairs.

Sub-family :—*Picianæ* (*Picinæ* ?), the True Woodpeckers. Bill wedge-shaped. Tongue vermiform.

(6319) *Picus*, Typical-Woodpeckers.—Bill perfectly wedge-shaped, cylindrical; the culmen straight; lateral ridges removed from the culmen. Versatile (outer posterior) toe always longer than the anterior (outer fore toe).

Sub-genera :—*Picus* (America and India); *Hemicircus* (India); *Dendrobates* (Africa; except two species from Tropical America); *Apternus* (Arctic Regions); and *Dendrocopus* (Universal.)

(6320) *Chrysoptilus*, Green-Woodpeckers.—Versatile and anterior toes of equal length. Lateral ridge nearest to the culmen, which is sharp, and either quite straight or very slightly bent. Bill depressed or widened at the base. Colour green banded or spotted with black. Sub-typical genus.

Sub-genera :—*Dendromus* (Africa and India); *Chloronerpes* (Tropical America); *Dryotomus* (America and Europe); *Chrysoptilus* (Tropical America).

(6321) *Malacolophus*, Rasorial-Woodpeckers.—Versatile toe shorter than the anterior, culmen curved. The lateral ridge (except in the typical group) wanting. Tarsus shorter than the versatile toe. Hind head with a crest of very soft feathers.

Sub-genera :—*Brachylophus* (Old World only); *Hemilophus* (India only). Typical :—*Malacolophus* (Tropical America only); *Meiglyptes* (India); *Chrysonotus* (India only).

(6322) *Colaptes.*—Tarsus lengthened and equal to the versatile toe; which latter is shorter than the anterior. Bill broader at its base than it is high; the sides compressed; the culmen considerably curved from its base; the lateral ridge either obsolete or entirely wanting. Nostrils partially defended by feathers.

Sub-genera :—*Geocolaptes* (Africa only); *Colaptes.*

(6323) *Melanerpes.*—Bill straight, more or less cylindrical; base wide; the ridge of the culmen slightly bent, but not very prominent; the sides rounded; the lateral ridge slight, and placed near but not close to the culmen. Gonys very long, as in the typical group. Nostrils nearly concealed. Wings long; the first quill spurious or very small; the second nearly as long as the third. Toes various. Habits gregarious and migratory. Colours black, varied with white and red. The fissirostral type (America only).

Sub-genera :—*Centurus*, *Leuconerpes*, *Melanerpes*, *Tripsurus.* Sub-family : *Buccoinae*, Barbets [BARBETS]. Bill surrounded with long bristles. Tail short, soft.

(6324) PICUS SHORII. Upper part of the head and elongated crest of the head and rump rich scarlet; a white line, extending from the base of the upper mandible to the occiput, edges the scarlet of the head; a black band originates behind the eye below this white line, passes through the ear-coverts to the back of the neck, and there spreads as far as to the back; cheeks and sides of the neck white, separated from the throat and forehead by a wavy black line passing from the gape to the sides of the chest; base of the lower mandible bordered by a brownish mark; throat white; back orange passing into various tints of scarlet on the shoulders and wing coverts, and on the rump into bright scarlet; quills, tail, and upper tail-coverts black; under surface dirty brownish-white, with black scale-like marks: bill and tarsi black. Length 12 inches. It is also found in the Himalaya Mountains. This three-toed woodpecker exhibits a close affinity with *P. tiga* (Horsf.) an inhabitant of the Indian Archipelago, as well in colouring as in the absence of the hinder toe, which in both birds is represented only by a rudimentary tubercle. Few, if any, of the tribe surpass it in brilliancy of plumage.—*Eng. Cyc.*

(6325) PICUS SQUAMATUS. Top of the head and occiput scarlet; above and below the eye a yellowish-white streak; a black line extending from the base of the lower mandible along the sides of the neck; the upper surface of a bright green; quill-feathers and tail dull olive-black, barred with white; throat and breast grayish-green; abdomen and under surface of a still lighter tint, marked with black scales closely and regularly disposed; bill yellowish-white, hornbrown at the base; tarsi brown. Length 12¾ inches. It is found in Asia, in the Himalaya Mountains.—*Eng. Cyc.*

(6326) PICUS CANUS, of the continent may be considered as a type of an intermediate class, and which are the only species found in Europe—the present species, as well as P. occipitalis, also a Himalayan bird, may be classed; all these birds being found, like the typical Woodpeckers, to frequent trees as a resort for food, while at the same time they equally subsist, like the ground-feeding species, on ants and other insects which they obtain on the surface of the ground. Mr. Gould further states that the locality of *P. squamatus*, as well as *P* *occipitalis*, is believed to be confined solely t the higher parts of the mountains.

(6327) PICKLES AND THEIR ADULTERATIONS. To persons unacquainted with the subject, the title of this article, "Pickles and thei adulterations," may appear somewhat singular and they may be disposed to ask, Are not th girkins, cabbages, beans, &c., which we se in the bottles, what they appear to be? An are other vegetables than those commonl known to us mixed with the ordinary kinds To these question we thus reply. "Girkins," on close examination, often turn out to b ut shrivelled or sliced cucumbers; the "young ender beans" to be old and tough; the "cauliowers" to have run to seed. and the "red cabage" to be nothing more than white cabbage urned into red by colouring matter, as a dyer ould change the colour of a dress; further, that mongst the vegetables, not unfrequently employl for the purpose of pickle-making, are some hich do not enter into the calculation of the picure, as vegetable marrows,—which, when ut into pieces, form a very respectable imitation f cucumbers,—and sliced turnips, the identication of which would be apt to puzzle even a otanist, as well as certainly all those who are ninitiated in the secrets of a pickle-manuctory.

1st. That the vinegar used for pickling is of a ery weak description, the percentages of acetic cid ranging between 1·48 and 2·91. It will be membered, that, vinegar of good quality ought contain from four to five per cent. of pure etic acid.

2nd. That nineteen out of twenty of the vinears submitted to analysis, poor as they were, t owed a portion of their acidity to sulphuric cid, the amount of which varied, in the different mples, from. 38 to 2·52 in the 1000 grains; e largest quantity of this acid being detected the vinegars in which the red cabbages were ckled.

3rd. That in the whole of the sixteen differt pickles analysed for copper, that poisonous etal was discovered in various amounts: two of c samples contained a small quantity; eight ther much, one, a considerable quantity: three very considerable quantity; in one, copper was esent in highly deleterious amount; and in o, in poisonous amounts.

4th. It will be observed, that the pickles nich contain the largest quantity of copper, are ose which consist entirely of green vegetables, girkins and beans.—*Food and its Adulterans, p.* 383.

(6328) PICRORRHIZA.

Teeta, Beng. | Nepaleæ Hoon ling, Thib.

This name is given in Bengal to the roots of ter herbs. This name is given in East Nepaul the Yaloong valley, to this plart which is ed as a febrifuge: the *Picroshiza*, is a plant ied to speed well, and grows at from 12,0 0 15,000 feet elevation, and is a powerful bitter, led "Hoonling," by the Tibetans.—*Hooker im. Jour Vol.* 1 *p.* 272.

(6329) PICRORRHIZA KURROOA. (Syn. ERONICA? LINDLEYANA, Wal. Cat.) Grows in osainthan, Kemaon, and Kedarkanta. A fleshy, oted perennial. Flowers sessile, deep blue, in nse spikes. The root is intensely bitter, and ed as a medicine in India.—*O'Shaughnessy p.* 8. This plant grows on the hills of Hindostan, as also in the Cashmerian mountains, and the root is much in use at Lahore; but more in veterinary than in human medicine.—*Dr. Honigberger, p.* 325.

(6330) PICTURE PLANT, Graptophyllum hortense, Justicia picta: variegated leaf: blood red leaf. The justicia, one variety of which has variegated leaves, and the other deep purple, is multiplied throughout the Tenasserim Provinces.—*Mason.*

(6331) PIENCHE, the Tamil name of a Ceylon tree which is of a dark colour and very heavy and close-grained. It grows to about twelve inches in diameter, and fourteen feet in height. From this tree the native carpenters make the frames of vessels, it being considered durable: it produces a fruit which is of no use.—*Edye, Ceylon.*

(6332) PIERARDIA. Of this genus, Wight gives Courtallensis, 1972-13; macrostachys, 1912-13.

(6333) PIERARDIA SAPOTA.

Kanayœ, Burm.

Plentiful in the Pegu and Tounghoo forests, as well as about Rangoon. Dark brown wood. —*McClelland.*

(6334) PIGEON PEA is the seed of the plant called by Linnæus *Cytisus Cajan*, and by De Candolle *Cajanus bicolor* and *Cajanus flavus.* It is a kind of pulse highly esteemed by all classes of the natives of India, and is by them regarded as holding the third rank among such articles of food. —*Eng. Cyc.* See Cajanus Indicus.

(6335) PIGMENTS. In illustration of the variety of indigenous pigments, says Dr. Cleghorn, I may state that finding my colour-box becoming exhausted, I have been enabled to supply, on more than one occasion, all its deficiencies without difficulty from the natural products of the surrounding forests of the Malabar Ghauts, including yellow from the *Garcinia*, blue from various species of *Indigofera*, red and purple from *Oldenlandia umbellata*, *Pupplaychukkay* (*Ventilago?*) and *Vatica laccifera.*

(6336) PIMELEA. A species of this plant is abundant in the Wynaad, where its fibre is made into sewing thread by the Natives. The plant is common all over the Neilgherries.—*McIvor, M. E. J. R.*

(6337) PIMELEA SPECTABILIS. Thymelaceæ. These are a beautiful genus of shrubby plants, growing to the height of two or three feet, they require a rich soil, and if carefully watered, produce numerous heads of flowers, the colours are white, red, rose and yellow, readily cultivated from seed.—*Riddell.*

(6338) PIMENTA VULGARIS. The "Allspice" tree, introduced from the West Indies. Several large trees are at Madras, but the climate of the Carnatic does not seem to suit them.—*Hort. Garden.* 46. *M E.J.R.* The pimento, *Eugenia Pimenta* (*Myrtus Pimenta*), is a native of Mexico, and the West Indies. It flourishes spontaneously and in great abundance on the north side of the Island of Jamaica ; its numerous white blossom mixing with the dark green foliage, and with the slightest breeze diffusing around the most delicious fragrance, give a beauty and a charm to nature rarely equalled, and of which he who has not visited the shady arbors and perfumed groves of the tropics can have little conception. This lovely tree, the very leaf of which when bruised emits a fine aromatic odor, nearly as powerful as that of the spice itself, has been known to grow to the height of from 30 to 40 feet, exceedingly straight, and having for its base the spinous ridge of a rock, eight or ten feet above the surface of the hill or mountain. A single tree has frequently produced 50 lbs. of the raw, or 100 lbs. of the dried fruit. The fruit has an aromatic odor, and its taste combines that of cinnamon, nutmeg, and cloves ; hence its common name of allspice. The fruit of *Eugenia acris* is used for pimento. The trunk is of a grey color, smooth and shining, and altogether destitute of bark. It is luxuriantly clothed with leaves of a deep green, somewhat like those of the bay tree, and these leaves are, in the months of July and August, beautifully contrasted and relieved by an exuberance of white flowers. The leaves yield by distillation a delicate odoriferous oil, which is said to be sometimes passed off for oil of cloves. The berries are gathered before they are ripe, and spread on a terrace, exposed to the sun for about a week, during which time they lose their green color, and acquire that reddish brown tint which renders them marketable. Some planters kiln-dry them. Like many of the minor productions of the tropics, pimento is exceedingly uncertain, and perhaps a very plenteous crop occurs but once in five years. In 1800 there were 12,759 bags and 610 casks of pimento imported from Jamaica ; in 1824 there were 35,308 bags and 599 casks shipped from the island ; in 1829 the quantity exported was 6,069,127 lbs. In the year ending October 1843, the export of pimento from Jamaica was 29,322 bags and 156 casks ; in the year ending October 1844, 12,055 bags and 88 casks ; in the year ending October 1845, 233 casks, valued at 30s. each, and 59,494 bags, valued at 20s. From 1st January to 1st August, 1851, 128,277 lbs. pimento were shipped from the port of Montego Bay, Jamaica. There was a very considerable pimento plantation made in Tobago, some years ago, by a Mr. Franklin, but it was abandoned by his sons, that they might attend the more exclusively to sugar culture. —*Simmonds.*

(6339) PIMPINELLA, a genus of Umbelliferus Plants inhabiting the meadows and mountains of Europe principally, is chiefly interesting on account of its comprehending among its species the Anise of the shops. This plant is an annual, with a smooth stem, one to one and a half foot high ; the lower leaves roundish, cordate, lobed, and both serrated and cut ; those of the stems pinnated with wedge-shaped lanceolate segments, and the upper trifid, with the lobes undivided and leaner. The flowers are small and white. The fruit is narrow, slender, rather hairy, with five filiform ridges to each pericarp. The latter is employed extensively as a carminative medicine, and for the purpose of flavouring liqueurs. The plant inhabits Egypt and the islands of the Grecian Archipelago, especially Scio.—*Eng. Cyc.*

(6340) PIMPINELLA ANISUM, ANISEED. (Ανισον. Dioscor.) Egypt, Scio, Levant. Lin.

Somboo, TAM.
Anisa, GUZ.
Sonf, DUK.
Razyanehroomee, PERS.
Sonf, HIND.
Aneesoon, ARAB.
Sataphuspha, SANS.
Mahoree, BENG.

Aniseed in various forms is much employed in medicine as a stomachic, especially in the diseases of children, and is also used as a condiment among all eastern nations. The seeds are often fraudulently mixed with clay, are liable to spoil by spontaneous fermentation in the packages. They are much richer in essential oil than the majority of the Umbelliferæ, 8 lbs. having given 3½ ounces of the oil.—*O'Shaughnessy, p.* 358.

Essential Oil of Aniseed.—Is white, yellowish, a little lighter than water, congealing at 78 Faht. into a soft mass, sp. gr. 0.985. It is liable to adulteration with spermaceti and several fixed oils, some of which may be detected by alcohol, all by leaving a greasy stain on paper when evaporated over a lamp. This oil contains nitrogen according to the analysis of Saussure. It only exists in the pericarp, the interior of the seed yielding a tasteless and inodorous fixed oil. This is often mixed with the essential oil, and is as much an adulteration as if castor or olive oil had been employed. The pure essential oil can only be obtained by distilling the seeds with water. The oil is a good and safe stimulant, and is much used in prescriptions for children suffering from flatulence and colic. (See ESSENTIAL OILS.)—*O'Shaughnessy, p.* 359.

(6341) PIMPINELLA CANDOLLEANA 341 ; involucrata, 335-567 ; Leschenaultii 1005. Are given in Wights Icones.

(6342) PINCHBECK, PETIT OR SIMILOR.

Tombak, DUT.
Similor, Tambac, FR.
Tomback, GER.
Wellacty-Soona, (Gu
HIND.
Tombacco, IT.
Tambac, Tambaga, S

A name given to one of the many imitations of gold, consisting of zinc combined in various proportions with copper or brass. It is frequently used as a substitute for gold, in the formation of watch-cases, rings, chains, lockets, &c. —*Faulkner.*

(6343) PINE APPLE. BROMELIA ANANAS. ANANASSA SATIVA.

Nanat, BURM.	Nanas, MAL.
Anasi, CYNG.	Koida checka, MALEA.
Anuanas, GUZ. & HIND.	Anasie-pullum, TAM.
Annasso, IT.	Ananas-pundoo, TEL.

A well-known succulent fruit of a tropical lant (*Ananassa sativa*), indigenous to America, nd the East and West Indies, and now reared n hot houses in England. In its aboriginal tate, it is inferior in every respect than when arefully cultivated; which may account for the uperiority of the English pine apples. *Apples* are perhaps the best of all the cultivated ruits of Pegu, and they require so little care, hat they are brought into market in Rangoon n vast quantities of the finest quality from the nd of April until the middle of August. In he upper parts of the province, about Prome nd Tounghoo, they are scarce.—*McClelland.* One of the most abundant fruits in the Tenasserim Provinces is the pine apple, also an American prouction. With the plant, the native American ame appears to have been introduced into Burmah, for *nanas* is said to be the name it had mong the Peruvians where it was originally ound, and the Burman name is *nánat*; which he Sgaus have abbreviated to *nay*.—*Mason.*

The *Pine Apple Tribe* or *Bromeliaceæ*: he Bromel worts, or the Pine apple tribe a natural order of Endogens, consisting dry herbaceous plants, remarkable for their rdness and dryness of foliage. The flowers of ost are pretty, and some of them remarkably ndsome and sweet scented; but except in the nus "*Ananassa*" the fruit is in no case of any lue: the order contains 25 genera and 130 pecies.—*Eng. Cyc. p.* 669. The Pine-apple, or nanas, is one of this tribe of plants, and is an obct of the most careful culture in Europe, on acount of its pleasantly sweet and aromatic fruit. s long and rigid leaves, which are thorny at the dges and point, abound in a quantity of fine hite fibres, which are, in some countries, oven into the finest fabrics, netted or twisted into lines for fishing and into ropes possessed of considerable strength. These are said ot to be injured by constant immersion in ater—a property which the natives increase tanning them. The Pine-apple (*Ananassa tiva*, formerly Bromelia Ananas), being a nave of the moist forests of South America, from e level of the sea to elevations of about 1800 et, requires, for its successful culture as a fruit, warm and moist climate; but, like others of e family, the species are capable of existing in warm, dry air. The Pine-apple is said to ve been introduced into India by the Portuese, in the year 1594. It has, in some parts, come so naturalised, as to appear indigenous. apt. Turner, in his journey to Teshooloomboo, entions it as very abundant at the foot of the Himalayas. It flourishes in Assam, and forms thickets near Rangoon, producing, also, according to the accounts of different visitors, very juicy, well-flavoured fruit. Dr. Wallich, in the year 1836, presented to the Agricultural Society, a bag made on the Khasia Hills, of Pine-apple fibre, having purchased it for a trifle at Cheraponjee. He mentions the enormous quantity of Pines grown on that range, and Dr. Oxley writes that thousands of acres of pine-apple plant, cover the adjacent islands, so that the supply might be considered inexhaustible, of a fibre remarkable as well for fineness as for strength.—*Royle Fib. Pl. p.* 377

Pine Apple or *Pina Fibre*, or *Bromelia*. The leaves of several plants, of the genus and family (*Bromeliaceæ*,) to which the cultivated pine-apple, ananassa sativa, belongs, abound in fine white fibres very soft, silky and pliant, as long in the stalk as flax and can be worked up with the same machinery. In some countries it is woven into the finest fabrics, netted or twisted into lines for fishing and into ropes possessed of considerable strength. These are said not to be injured by constant immersion in water—a property which the natives increase by tanning them. The Pine-apple being a native of the moist forests of South America, from the level of the sea to elevations of about 1800 feet, requires, for its successful culture as a fruit, a warm and moist climate; but like others of this family the species are capable of existing in a warm, dry air. The Pine-apple is said to have been introduced into India by the Portuguese, in the year 1594. It has, in some parts, become so naturalised, as to appear indigenous. Capt. Turner, in his journey to Teshooloomboo, mentions it as very abundant at the foot of the Himalayas. It flourishes in Assam, and forms thickets near Rangoon, producing, also, according to the accounts of different visitors, very juicy, well-flavoured fruit. Dr. Wallich, in the year 1836, presented to the Agricultural Society, a bag made on the Khasia Hills, of Pine-apple fibre, having purchased it for a trifle at Cheraponjee. He mentions the enormous quantity of Pines grown on that range, and that the plant appears as if it were quite a natural production. Dr. Helfer describes the Pine-apple as so abundant in the Tenasserim provinces as to be sold in Amherst Town in the months of June and July at the rate of one rupee for a boat-load. It chiefly abounds in low grounds, though it is also to be found in the hills amongst the Karens. The natives know it only by the American name, which they transform into *Nannah thi*—thi designating fruit. They do not seem to be acquainted with the beautiful fibre yielded by the leaves. The Pine-apple is described as growing in great abundance in the Philippine Islands, but as producing only a small, rather dry fruit. But we require some precise information to enable us to judge whether this is actually the plant escaped from cultivation. M. Perrotet considers it a distinct species, and has named it *Bromelia Pigna*, from the Spanish name *Pigna* or *Pina*, signifying a cone. There, this wild plant is valued on account of the fine hair-like fibres which are separated from out of the leaves. Of these fibres, the celebrated pine-apple cloth of the Philippines, sometimes called "batiste d'ananas," and resembling the finest muslin-like fabric, is woven. This is embroidered by the nuns of the convents in Manilla, with great skill and taste. Some beautiful specimens of these, under the name of Pina muslin, were to be seen in the Exhibition of 1851. This is sometimes called grass-cloth, but erroneously. With a magnifier the fibres may be seen to be very numerous and fine, but not twisted at all, as in grass-cloth or the finest muslins and cambrics. Mr. Bennet, in his 'Wanderings,' observes that one of the coarser fibres may be subdivided into threads of such fineness as to be barely perceptible, yet sufficiently strong for any purpose. Mr. Bennet mentions visiting a plantation near Singapore, made by a Chinaman, for the preparation of the fibres of the ananas or wild pine-apple, which are exported to China, being used there " in the manufacture of linens." The Chinese said he got 1½ rupees the catty, for the fibre. The leaves recently gathered—and the largest are preferred—are laid upon a board and the epidermis is removed with a broad knife. Upon its removal from the upper surface of the leaf, the long and beautiful fibres were seen lying upon the lower and denser epidermis, running in a longitudinal direction; the fasciculi of fibres were then readily detached by the hand, on being raised with the broad knife. The separation of the fibre of the ananas is practised in other places besides the Philippine Islands. The Singapore Committee forwarded specimens (*Talinanas*) from Malacca, as well as some of three different qualities prepared at Singapore, and a portion as ready for weaving, that is, with the ends gummed, or joined together by some adhesive substance; thus forming the "invisible knots" of an old author. Specimens were also sent from Java and the island of Celebes. Dr. Roxburgh does not appear to have paid much attention to the separation of the ananas fibre; but in the year 1839, Miss Davy sent specimens of a thread prepared from the wild pine-apple plant of Assam, of various degrees of fineness, observing that the thread must be prepared when the leaves are green, as nothing can be done with them in a dry state. Miss Davy subsequently sent specimens of cloth manufactured from this thread to the Agricultural Society of Calcutta, observing that she had had much difficulty in getting it woven, as the principal manufacturers in Dacca positively refused to undertake making it into cloth. A weaver in the jungles near Dacca, afterwards undertook to do so, and wove the cloth which was sent. Of this, Miss Davy had some embroidered in silver,—a style of work in which the natives of that part of the country excel. The specimens of the fibre were shown by Mr. E. Solly to spinners in England, but who did not consider it would be substituted for flax in the manufacture of textile fabrics. A patent was, however, taken out by Mr. Zincke, for the manufacture of thread from this fibre, because when bleached, it could be spun in the same way as flax. The process of bleaching, by destroying the adhesion between the bundles of fibres, renders it much finer; and hence enables it to be extended between the rolls in the process of spinning. He considers that from its beautiful silky lustre, combined with considerable strength it is well adapted to form a substitute for linen Pine-apple fibres (*anasa nara*), and the tow o oakum from them, were also sent to the London Exhibition of 1851, from Madras and from Travancore, showing that the art of separating thes fibres is extensively diffused. Dr. Hunter received some very fine, strong, and silky fibre from Porto Novo, prepared by Mr. Lima Besides the fibre, some twine and cord mad with it was also sent from Madras an from the Eastward. Mr. Bennett says, tha at Singapore, from the cost of labour, the pine apple fibre could not be prepared under thirty eight or forty dollars the pecul; but in Penang or other places where labour is cheap, and women and children could be employed upon it, th expense would hardly exceed ten dollars per pecul. In the experiments which Dr. Royle mad with these various fibres, a certain quantity of those prepared at Madras bore 260 lb., while similar quantity from Singapore bore 350 lb. before they broke; but of New Zealand flax the sam proportions bore only 260 lb. In a repor from the Arsenal of Fort William, dated Jun 3d, 1853, the results are given of some experiments made by Conductor Wilkins on sever kinds of rope manufactured by Messrs. W. I Horton and Co., of Calcutta; and among the there is one of Pine-apple fibre, of three inche and a quarter in circumference. The Government proof is that a rope of this size should bea a weight of 42 cwt., but it bore no less than 1 cwt. more, that is, it broke with a weight of 5 cwt. ('Journ. of Agric. Soc. of India,' vol. vii p. 182); proving incontestably that Pine-app possesses strength for cordage, as well as finene for textile fabrics.—*Royle Fib. Pl. p.* 37.

(6344) *Bromelia. Pinguin*, or "Broad leave wild ananas," is common in Jamaica and oth West India Islands. Its leaves yield a strong fibr which is made into cloth of which they make hammocks, and twisted into ropes Amongst other Bromel worts may be mentioned, *B. karatas*, "upright leaved wild ananas," common in Sout America, *B. sagenaria*, common on the coast near Pernambuco, also *B.* (*now Bilbergia*) var gata, yields excellent twine for nets in 3razil: and the so called New Orleans moss r "longbeard" of which a bale was sent to he Exhibition in 1851, and proposed as substitute for hair for stuffing chairs, cushions nd mattresses.

(6345) PINE NUTS, (Neoza Chilghoza. rom N. W. India, Caubul, &c. See Pinus Ge-ardiana.

(6346) PINNOTHERIDÆ, a family of the 3rachyurous Crustaeca called Pinnotherans by Iilne Edwards, known by the Common name f Pea-Crabs; of these *Elamena* (M. Edwards) is ounded on *Hymenosoma Mathæi*, figured by M. uppell, in his work on the 'Crustacea of the Red ea' and separated from that genus by Mr. Milne-dwards, who thinks that it seems to establish ne passage between the *Hymenosomata*, the *xystomes*, and the *Oxyrhyycnhi*.

E. Mathœi (Ruppell, 'Krabben,' pl. v. f. 1), is ound in the island of Mauritius and the Red ea.

(6347) PINS.

Epingles, Fr.	Tanek-nee, Guz.. Hind.
Stecknadeln, Ger.	Alfeen, Hind.

Well-known little instruments, manufactured ı a large scale in Birmingham, Warrington, heffield, Gloucester, and London.—*Faulkner*.

(6348) PINUS, a genus of Gymnospermous xogenous Plants, consisting for the most part timber trees, inhabiting various temperate ountries in the northern hemisphere. They are ommonly called Pine-Trees, and are distinguish-l from the Firs by their leaves, always ever-reen, and needle-shaped, growing in pairs, rees, fours, or fives, surrounded by a membran-ıs sheath at their base. In reality each parcel leaves indicates a small branch axillary to a embranous, deciduous, withering leaf. The oecies are generally of great beauty as objects ornament, or of much value on account of their nber, and are in much request by the planter: ı which account we give a very brief enumera-on of the best known species.—*Eng. Cyc.*

(6349) PINUS or CEDRUS DEODARA, ves and twigs used in native medicine. Kelon, *ind.* the most celebrated of the Himalayan pines, oticed by Avicenna, found in Nipal, Kemaon, ashmere, at 7,000 to 12,000 feet. *Prod.* A rpentine called *Kelon ka tel*, used as a stimu-nt to foul ulcers.—*O'Shaughnessy, p.* 612.

(6350) PINUS EXCELSA, Wall. Pl. Rar. t.)1. Narambetty, Nipal, Simla, Bootan. *Kuel* Sirmoor and Gurhwal, resembles the Wey-outh pine, and is remarkable for its drooping anches.—*O'Shaughnessy, p.* 612.

(6351) PINUS EXCELSA.

Tongsehi, Chin.

Though common in Bhotan, is, as I have elsewhere remarked, not found in east Nepal or Sikkim; the wood is admirable, being durable, close-grained, and so resinous as to be used for flambeaux and candles.—*Hooker Him. Jour. Vol.* II. *p.* 45.

(6352) PINUS GERARDIANA. Neoza chilgoza of Elphinstone. The Neoza Pine. Trunk lofty, with a conical head. Leaves 3, short, stiff, glaucous, obsoletely serrated, with deciduous sheaths. Cones very like those of *P. longifolia.* Seeds large, eatable. A native of the coldest forests of the Himalayas.—*Eng. Cyc.* The seeds form one of the principal articles of subsistence in Kunawur.—*O'Shaughnessy, p.* 613.

(6353) PINUS HALEPENSIS, the Alleppo Pine. Trunk slender, erect. Leaves 2, long, slender, light green. Cones ovate, stalked, solitary, very regular in form, with depressed truncated scales. A beautiful species, found wild in the western parts of Europe, from Genoa to Constantinople, and also throughout Syria. It grows fast, and is at once known by its fine light-green foliage; but its wood is not of much value, and it bears the climate of England with impatience.—*Eng. Cyc.*

(6354) PINUS LATTERI. Some twenty years ago the residents of Maulmain were not a little surprised to find, among the drift wood of the Salwen, a log of some coniferous tree. This was the first intimation that any tree of the pine tribe grew on the borders of these Provinces; but whether it were of the genus pinus, or abies, or larix—a pine, a fir, or a larch, did not appear. It was several years after this occurence, that a commissioner told Mr. Mason, he had offered a hundred rupees to any of the foresters who would bring down a spar of this tree. Spars have been since brought down, but it is believed that Capt. Latter was the first European to visit the locality where the tree is indigenous, and from specimens of the foliage and fruit, which he brought away, it appears to be a new species of pine that may be characterized thus:

P. Latteri. Arbor 50—60 pedalis, cortice seabro, foliis geminis 7—8 uncialibus caniculatis serratis scabbriosculo, strobilis 4 uncialibus ovato-conicis, squamis rombeis inermis.

Hab. In provincia *Amherst*: in convalli fluvii *Thoungyeen.*

Descr. A tree from 50 to 60 feet high, or more and from $1\frac{1}{2}$ to 2 feet or more in diameter. Sheaths of the leaves arranged spirally, tubular, membranous.—*Mason.*

(6355) PINUS LONGIFOLIA. Himalayas.

Cheer, sidlah, surul, thausa, Hind.

The Long-Leaved Pine. Trunk erect, with a coarse rugged bark, and whorled branches.

Leaves very long, drooping, slender, bright-green, channelled, and serrated. Cones shorter than the leaves, oblong ovate, woody, and rugged, with pyramidal obtuse, mucronate, corky, recurved scales. Seeds large, eatable. An Indian species inhabiting the valley and lower hills of Nepaul, (*Eng. Cyc*): also the Entrance to Nipal in the Kheree Pass, along Tonse and Jumna rivers, at elevations of 5,000 and 6,000 feet. *Produce*, gunda biroza, birje or cher ke gond. Birozehtir, *Pers.* same name also given to Indian olibanum.—*O'Shaughnessy, p.* 612. This pine is called by the Lephas "guiet-koong," and by the Bhoteeas "Teadong" in Sikkim only: it grows in low valleys, where better timber is abundant—*Hooker, Vol.* II. *p.* 45. The scenery of the valley Nyong in East Nepal is the most beautiful in the lower Himalaya: the Cheer Pine (*P. longifolia*) is abundant, cresting the hills, which are loosely clothed with clumps of oaks and other trees, bamboos, and bracken (*Pteris.*) —*Hooker. Him. Jour. Vol.* 1. *p.* 182.

(6356) PINUS SINENSIS, the Chinese Pine. A large tree. Leaves 3, slender, deep green, serrulated. Cones ovate, brownish, on short stalks, with flattened truncate, unarmed scales. Native of China. Very little is known of it, except from Chinese drawings. In England it only exists in the garden of Mr. Weels of Redleaf, near Tunbridge, where it is found to be 'tolerably hardy.'—*Eng. Cyc.* It is repeatedly noticed by Mr. Fortune. He says, *Pinus Sinensis*, is met with on the sides of every barren hill, both in the south and north of China, and is generally badly used by the natives. —*Fortune's Tea plants, page* 7. The Chinese pine (Pinus sinensis), which is grouped about in all directions, attains to a great size. Many of these hills are well wooded. I remarked as we went along good forests of Chinese pine (Pinus sinensis), the Japan cedar (Cryptomeria Japonica), and the lance-leaved fir (Cunninghamia lanceolata). The forests of the Japan cedar and the lance-leaved fir were extremely picturesque and beautiful. The trees generally were young and not remarkable for size but were growing vigorously, and likely, if allowed to stand for a few years, to make valuable timber. In addition to this consideration, there was a symmetry and grace in the general appearance of these forests which one rarely sees in temperate climates, if we except perhaps the Himalaya mountains.—*Fortune's Res. p.* 189.

(6357) PINNAY, Calophyllum Inophyllum.

(6358) PINEY VARNISH TREE. VATERIA ROXBURGHIANA. Trees which yield this beautiful varnish so extensively used in Hindustan, are very common about Maulmain, yet I am not aware that the varnish is collected.—*Mason.* The tree grows from cuttings and is found planted by the road side in Malabar. The resin or substance as it flows from the tree, applied while in its fluid state, makes a good varnish called Peiny varnish in the Malabar coast, and there, the tree is commonly called the Peiny varnish tree, or Peiny marum. It is mentioned by Dr. Buchanan in his Journey through Mysore, Canara and Malabar. In Vol. 2 P. 476, he says some men of the Panchala tribe, which here is called Peninglan, paint and varnish by the following process. They take butter milk and boil it with a small quantity of quick lime until strings form in the decoction, and separate from the watery parts, which they decant. The stringy matter is then mixed with the paint, which has been well powdered: with these the wooden work is first painted, it is then allowed to dry for one day, and afterwards receives a coat of Pundum, which is the fresh juice of a tree called Peiny Marum. The Pundum must be used while it is fresh and will not keep for more than two or three days after the first coat of paint is given, and that is followed by another of varnish. In the same manner leather may be painted and varnished. The varnish effectually resists the action of water. A valuable Tallow, which has lately been sold in England at 44s. 6d. the pound, nearly equal to the price of the best Russian Tallow, is prepared by boiling the seeds in water: it is said to be free from any disagreeable smell—*Rohde, M.S.S.*

The *Vateria Indica* (*Chloroxylon Dupada*, Buchanan and Ainslie, and Pinney marum of the Hindoos) produces a resin resembling Copal, much finer than that procured from the other species, natives of India, the finer specimens of which are as transparent as amber and nearly colourless. It is procured by the very simple process of cutting a notch in the tree, sloping inwards and downwards. This is soon filled with the juice, which in a short time hardens by exposure to the air. When used as a varnish the usual practice is to apply the balsam before it has become hard: but when that is not procurable the resin melted by a slow heat and mixed with boiling linseed oil forms a varnish which answers equally well for most purposes. As this varnish is of the finest description, the following formula for its preparation may prove useful to some who are unacquainted with the process. Into a new and perfectly clean earthen vessel (a chatty) put one part of the Piney dammer, in coarse powder, cover closely, and apply a *very gentle* heat until the whole is melted; then add about two parts of linseed oil, nearly boiling hot, and mix well with a wooden spatula. Should the varnish prove too thick it can at any time be reduced by the addition of more oil, or if required, may be made thicker in the first instance. It is essential to the success of the process that the Piney be melted in a covered vessel over a very slow fire, and the whole of it reduced to a thin before the addition of the oil, which must, to ensure an equal mixture, be nearly boiling hot. This varnish is used for carriages and other fine furniture requiring to have their paint well protected, or to which it is desirable to impart a fine gloss. A spirit varnish is prepared by reducing to powder about six parts of Piney and one of Camphor, and then adding hot alcohol sufficient to dissolve the mixed powder. Alcohol does not dissolve Piney without the aid of the Camphor, but once dissolved will retain it in solution. The varnish thus prepared is employed for varnishing pictures, &c., but before being used requires to be gently heated to evaporate the Camphor, which otherwise will produce by its after evaporation a roughness and inequality on the surface of the picture, and spoil its appearance.—*O'Shaughnessy page.* 755.

(6359) PINEY TALLOW OR DOOPADA OIL. VATERIA INDICA.

Piney Yennai TAM.
Doopada Nunee, TEL.

This most valuable tree, which, besides the product under consideration, yields a Resin nearly equal to copal, and an excellent building wood, grows plentifully in the jungles of the Western Coast. The oil, which is perfectly solid even in hot climates, is prepared by cleaning the seeds, then roasting and grinding them into a mass. To 5 seers of seed, add 12 seers of water, and boil until the oil rises to the surface. Remove the oil, stir the contents of the vessel, and allow it to stand until the following day, when more oil will be observed on the surface, which may be collected and the process repeated. The oil is principally used for lamps, but is very suitable for soaps and candle making.—*M. E. J. R.*

(6360) PIPECLAY. A very plastic and tenaceous kind of clay, of a grayish, or yellowish-white colour, found near Poole in Dorsetshire, in the Isle of Purbeck, and in many places in India. It is manufactured into tobacco pipes; and is besides used as the basis of the queens's-ware pottery, as well as a detergent by scourers of cloth.—*Waterston. Faulkner.*

(6361) PIPER, a genus of Plants belonging to the natural order *Piperaceæ.* It has stamens varying in number from 1 to 10; stigma 3-lobed; fruit baccate. Wight gives in Icones Piper arborescens, 1940; argyrophyllum, 1941; attenuatum, 1933; hymenophyllum, 1942; Nepaulense, 1938; nigrum, 1934; Sylvestre 1937; trioceum, 1935-6; Wightii, 1939.

(6362) PIPER BETLE, Linn. Roxb. Fl. Ind. i. p. 158. Bot. Mag. t. 3132 *φυλλον μαλαβαθρον Diosc.—O'Sh.*

Vettilay. TAM.
Pan, DUK.
Tanbool, ARAB.
Tambuli, SANS.
Pan, HIND.
Tamalapakoo, TEL.
Bargi tambol, PERS.
—*Ainslie.*

The leaves of this and P. Siriboa are extensively used by the natives of the East Indies and lately the West, to chew along with the nut of the *Areca catechu* and quicklime, as a restorative of the powers of the stomach and promoter of digestion. It is capable however of producing, like some other species of *Piper*, intoxicating effects, and should be used in moderation.—*Eng. Cyc.* Piper Betle in Pegu, grows both in a wild and cultivated state. It is cultivated in small quantity for domestic consumption in every part of the province, except the Tharawaddy district; and grows wild in the Pegu Forests; on the Gadoojway Choung.—*McCelland.*

(6363) PIPER CUBEBA. CUBEBS. Lin.

Val mellaghoo, TAM.
Kubab-chinie, HIND.
Dumke mirchie, DUK.
Komoon koos, MALAY.
Salava mirialoo, TEL.
Kababah, ARAB.
Suganda marichi, SANS.

A native of Java. Powdered Cubebs given in doses of one to two drams, in water or milk, is employed in Gonorrhœa with almost certain success; according to Blume, the Piper Caninum which corresponds with the P. Cubeba of Rox., Fl. Ind, 1. p. 164, is also a native of Java, and the chief source of the Cubebs of commerce.—*O'Shaughnessy, p.* 574. The fruits of both are stalked, but that of the former is larger and has more pungency than the latter. Both are common in Java, where, as in other parts of India, they are used as a grateful condiment, as common pepper is in Europe. They are also employed medicinally in the same complaints as give them repute in Europe. The berry is small, about the size of black pepper-corns (but with a little foot-stalk, from one-third to half an inch long, hence called sometimes *P. caudatum* or *P. pedicellousm*, more or less round, of a blackish-gray or grayish-brown colour, with a thin vascular reticulated husk, which incloses a hard round oily seed. The husk has a pleasant taste; the seed a bitterish, acrid, peppery, aromatic, and camphor-like flavour. Those which come from the islands of the Indian Archipelago are the best. A sort from the Mauritius, small, or about the size of a millet-seed, are from some unknown species. The Guinea or African cubebs is the produce of *P. Afzelii.* Indian cubebs are frequently adulterated with black pepper, pimento berries, or the fruits of the *Rhamnus catharticus.* Genuine cubebs consist of waxy matter, two kinds of volatile oil, a peculiar resin (cubebin), balsamic resin, &c. The volatile oil by rest deposits a camphor, which crystallizes in four-sided plates. The resin is analogous to that of copaiva, and has, like it, a peculiar influence over mucous, membranes especially those of the urino-genital-organs.—*Eng. Cyc.*

(6364) PIPER LONGUM, LONG PEPPER. *Roxb. Fl. Ind.* i. p. 154.

Pipilic, TAM.
Pipuloo, TEL.
Pipilic, DUK.
Pipel, HIND,
Pippali, also Krishna, SANS.
Dar filfil, ARAB.
Filfil-i-Daraz, PERS.

Piper Longum, Long Pepper, is a native of the East Indies, the female spike of which having attached to it the dried half-ripe berries (resembling the catkin, of the birch), is used in medicine. It has nearly the same chemical composition and properties as black pepper, though feebler. It is said to contain piperin. The root is employed by the Hindoos, but it is still weaker than the fruit.—*Eng. Cyc.* This grows wild in India, along water-courses towards the Circar mountains, but is much cultivated. Root (Granthicka, *Sans.*) sliced and dried constitutes the *Pippula moola* of the native druggists, a substance much used as a stimulant remedy and spice. The analysis of the fruits of the long pepper corresponds closely in results with those of the *Piper* nigrum.—*O'Shaughnessy, p.* 575. Long Pepper is a creeper of easy culture and should be trained on poles, or have strong sticks to grow upon. It is common in all parts of India.—*Jaffrey. Long Pepper* (Piper longum, Lin.) is extensively cultivated in the Northern Circars, its use is rather limited ; as in the commercial returns it is always included with black pepper, the quantity cannot be ascertained.—*M. E. J. R.*

(6365) PIPER METHYSTICUM. Ava pepper. A native of the Society, Friendly, and Sandwich islands, where it is called "Ava ;" used in a tincture in chronic rheumatism, and in infusion as an intoxicating beverage, which is also deemed antisyphilitic. To cure venereal, the patient drinks an infusion until he become drunk, after which copious perspiration ensues. *O'Shaughnessy, p.* 575.

(6366) PIPER NIGRUM, Willd : BLACK PEPPER. πιπερι. Hip.

Mellaghoo, TAM.
Gammiris. CING.
Merialoo, TEL.,
Marchu, SANS.
Gol murch, HIND.
Kala murch, DUK.
Filfil Uswud, ARAB.
Filfil-seeah, PERS.

A native of Malacea, Java and Sumatra, cultivated all along the Malabar Coast. Dr Roxburgh describes it as being found wild among the hills of the Rajamundry district—*Ainslie, p.* 265. *O'Sh. page* 571. Piper Nigrum, Linn, Black Pepper, a climbing plant of the East Indies, and very extensively cultivated there, the plantations stretching from 96° to 115° E. long., 5° S. lat. to 12° N. lat. which limits comprise Sumatra, Borneo, the Malay Peninsula, and all countries to the east of the Gulf of Siam. The best pepper comes from Malabar, the least esteemed from Java and Sumatra. The plant is allowed to grow, trained to the stem of the *Areca catechu*, and other trees, especially the Jack (*Artocarpus*) and *Hyperanthera moringa* (or Horse-Radish Tree), four years before the fruit can be collected. The berries are gathered when yet green, before they are perfectly ripe, and quickly dried on mats, by which they turn black. When plucked too young, they speedily fall into a state of powder. These are separated from the others by sieves and winnowing. In this condition it is termed black pepper. White pepper is the same fruit freed from the outer rind : for this purpose, the ripe berries are allowed to macerate in water, and the husk is removed. These are smaller, smooth, of a greyish-white colour, varying to yellow, with a less powerful odour and taste than the black.—*Eng. Cyc.* Although principally the produce of the Eastern islands, it is grown of a superior quality in the Malabar coast. The root is a tonic and cordial.—*Riddell.* Black pepper (piper nigrum) and long pepper (piper longum) grow wild in considerable quantities in the hilly tracts of Goodem, and probably along the whole of the pestiferous range of the Eastern Ghats The latter finds its way in small quantities down to the bazars on the coast, but the black pepper is entirely neglected, and does not appear to be gathered even for local use.—*M. C. C.*

(6367) PIPER NIGRUM AND PIPER LONGUM. BLACK PEPPER AND LONG PEPPER. These substances appear to have been used as febrifuges in the east from the earliest periods. The powder and the root of long pepper have been much employed in Hindu medicine.—*Ind. Ann. Med. Sci. for Apl. p.* 394.

(6368) PIPER SYLVATICUM. Roxb. Fl. Ind. i. p. 156. N. W. Mountains of Bengal, (*Pahari pippul,*) used while green, and ripe also, as long pepper.—*O'Shaughnessy, p.* 575.

(6369) PIPER TRIOECUM. Roxburgh. Fl. Ind. i. p. 154.

Mirial tiga, TEL.

Circar mountains, in shady places, with rich soil, fruit succulent, small, round, red, excessively pungent, an article of important commerce from Madras.—*O'Shaughnessy, p.* 575.

(6370) PIPPALLY CATTY, the dried long pepper vine.

(6371) PIPRINÆ, Mr. Swainson's name for the Manakins, which he makes a sub-family of the family *Ampelidæ*, Fruit-Eaters, or Chatterers, and thus characterises :—Size small. Feet lengthened, slender, weak. Bill very short : the upper mandible much curved. Mr. Swainson is of opinion that the *Piprina*, called Manakins from their diminutive size, which is seldom larger than that of a tom-tit, constitute the sub-typical group of this family.

(6372) *Phœnicurus, Pipra* (with its sub-genus *Metopia*), *Calyptura*, and *Pardalotus*, are the genera arranged by Mr. Swainson under this sub-family.

(6373) PIPTANTHUS NEPALENSIS. Amongst the plants on the Tendong in Sikkim, conspicuous is the beautiful laburnum-like *Pip-*

tanthus Nepalensis, with golden blossoms, —*Hooker. Him. Jour. Vol.* II. *p.* 5.

(6374) PIRI, the Tamil name of a Ceylon tree which grows to about twenty feet in height, and two feet in diameter. It is very close in its grain, and is used by the natives for the frames of vessels and in house-work. It produces a fruit which is of no use.—*Edye, Ceylon.*

(6375) PISONIA GRANDIS, NYCTAGINEÆ, Riddell.

Bag-Achera, DUK.

A straggling shrub, armed with strong axillary recurved thorns; flowers small, in axillary terminal panicles. Forms an excellent hedge plant.

(6376) PISONIA INERMIS.

Kongi-putri, DUK.

Without thorns.

(6377) PISONIA MORINDIFOLIA. THE LETTUCE TREE.

Lutchee-kottay-ellay, TAM.

The leaves of this pretty tree are used in various ways; sometimes by Europeans; they make tolerable greens cooked with cocoanut, chillies, &c., &c., to be found only in gardens, leaves of a light green colour, turning nearly white during the hot months.—*Jaffrey.*

(6378) PISTACIA, a genus of Plants belonging to the natural order *Anacardiaceæ*. It has diœcious, apetalous flowers. The male flowers with the raceme amentaceous, with 1-flowered bracts; calyx 5-cleft; stamens 5; anthers subsessile, 4-cornered. Female flowers with the raceme more lax; calyx 3-4-cleft; ovary 1-3-celled; stigmas 3, rather thick. Drupe dry, ovate, with a somewhat bony nut, usually 1-seeded and 1-celled. Seeds solitary, each without albumen. *Eng. Cyc.*

(6379) PISTACIA LENTISCUS. MASTIC TREE. A Native of the South of Europe and of Asia Minor, introduced into the Calcutta Garden in 806. The bud, bark, leaves, and fruit have all been used in medicine, but have been laid aside in modern times.—*Roxburgh.* The bush is found on the coasts of the Mediterranean. The leaves are evergreen, equally pinnate; leaflets 8 to 12, usually alternate, with the exception of the two upper, which are opposite, oval, lanceolate, obtuse, often mucronate, entire, and perfectly smooth. Flowers very small, in axillary panicles, similar to those of the other species; fruits very small, pea-shaped, reddish when ripe. The sweet fragrant stimulant resin called *Mastich* is obtained from the trunk by incisions made in the month of August. It is used to strengthen and preserve the teeth and in diarrhœa.

(6380) *Mastic Resin*, Roomic Mastike. or Turkish olibanum, Manna of Lebanon.

Sakes, ARAB.
Koondur Roomee, PERS.
Kinnoli, TUR.
Ulmastiga, SP.

This valuable substance occurs in oval tears of variable size, smooth, diaphanous, brittle, breaking with plane brilliant, glassy, and pale yellow surface, and owing to its brittleness being usually covered with its own dust. Its odour is agreeable; flavour weakly balsamic; it softens in the mouth, and becomes ductile like white wax. It melts at a moderate heat, and then exhales a sweet odour. Mastic is quite insoluble in water, it yields to alcohol 80 per 100 of soluble matter, leaving a substance resembling caoutchouc, which is slowly dissolved by ether. This resin gives its name to the process of *mastication*, being universally chewed in the East; it is much used by dentists for filling up carious teeth; it is burned as incense; and in some parts of Greece it is added to bread in small quantities to give it an agreable flavour. Mastic is extensively employed as a transparent varnish, dissolved in turpentine or alcohol, with other resinous bodies. A species of mastic called *tum* is obtained in Africa from the Pistacia Atalantica. The true resin is sold in all the Bazars for about three rupees the seer.—*O'Shaughnessy, p.* 278.

(6381) PISTACIA TEREBINTHUS. Pist. vera. Terebinthus vulgaris.

Katinge Roomie, ARAB.
Zungbarie, PERSIAN.
Butum, ARAB.
Sukhur, PERS. (Royle).

A native of Barbary, Greece, and the South of France. A resinous juice of much value is afforded by this tree.—*O'Shaughnsesy, p.* 276.

(6382) PISTACIA VERA, is a small tree, or large bush, from 15 to 20 feet high; its leaves are alternate, unequally pinnated, without stipules, and consist of from 3 to 5 oval blunt leathery smooth leaflets. The flowers are small, and arranged in short branched racemes from the old wood; some are male and others female; the latter are succeeded by dry drupes about the size of an olive, of a reddish colour, with a very thin rind, a brittle 2-valved shell, and contain a single almond-like seed with a green embryo. The tree is originally from Asia Minor, but is now naturalised all over the South of Europe, where the fruit is in request for confectionary and for the dessert, under the name of Pistachio Nuts. —*Eng. Cyc.* According to Mr. Elphinstone it grows wild in the Hindu-kosh. The almond and pericarp are imported into India from Cabul, with a kind of gall termed *Gool-i-pista* and a resin called *Alook-ul-imbat*. *Royle's Illustra.*, p. 178.—*O'Shaughnessy, p.* 277.

(6383) PISTACHIO NUTS.

Pistasjes, DUT.
Pistaches, FR.
Pistaschen, GER.
Pistach, GUZ. & HIND.
Pistacchi, IT.
Pistaciæ, LAT.
Alfocigos, SP.

The produce of *Pistachia vera*, which grows abundantly in Arabia, Persia, Syria, and Sicily. They are oblong and pointed, about the size of a filbert, inclosing a kernel of a pale greenish colour, covered with a yellowish or reddish skin. They have a pleasant, sweetish, unctuous taste, and are chiefly served up at the dessert. Pistachio nuts are imported into Bombay from the Persian Gulf.—*Faulkner.*

(6384) PISTIACEÆ, *Lemnads*, or Duck Weeds, a natural order of Endogenous Plants. The species are floating or land plants with very cellular, lenticular, or lobed fronds or leaves, some of them wholly destitute of spiral vessels, except perhaps in the pistil. The flowers appearing from the margin of the fronds 2 or 3, naked, inclosed in a spathe, but without a spadix. In the male flowers the stamens are definite, often monadelphous ; in the female flowers the ovary is 1-celled, with one or more erect ovules ; style short, stigma simple, ovules anatropal, hemianatropal, or atropal. Fruit membranous or capsular, not opening, one or more seeded ; seeds with a fungous testa and a thickened indurated foramen ; embryo either in the axis of fleshy albumen and having a lateral cleft for the emission of the plumule, or at the apex of the nucleus, covered in by a hardened endostome. The common Duck-Weed *Lemna* may be regarded as the most simple of all Phænogamous Plants. It inhabits the ditches of the cooler parts of the world. [Lemna.] *Pistia* is found in the tropics ; *Ambrosinia* in the basin of the Mediterranean.—*Eng. Cyc.*

(6385) PISUM, a genus of Plants belonging to the natural order *Leguminosæ*, and the tribe *Vicieæ*. It has a calyx with foliaceous segments, the two upper ones being shortest ; the vexillum ample, reflexed ; the style compressed, carinated, villous above ; the legume oblong, rather compressed, but not winged ; the seeds globose, numerous, with a rotundish hilum.—*Eng. Cyc.*

(6386) PISUM ARVENSE has 1-flowered peduncles and always red flowers, and yields the gray peas of the fields.—*Eng. Cyc.*

(6387) PISUM SATIVUM. Pease. Lin.

Puttance, Tam.	Herenso. Sans.
Patana, Guz.	Batançe, Hind.
Buttaneh, Duk.	Common Pea. Eng.
Goondoo sanigheloo Tel.	*Ainslie*, p. 241.

Pisum Sativum has two or many-flowered peduncles, with red or white flowers and is the common pea of our fields and gardens.—*Eng. Cyc.* These are indigenous to the Mahratta countries. The native country pea is sown after the rains in drills, and varies in price according to the quality ; when green, they are tolerable as a vegetable, but are best in soup. Procurable in December and January.—*Riddell.*

(6388) PITA or AGAVE, commonly called Aloe (*Agaveæ*, a tribe of *Amaryllideæ*).

Cantala and Bans-keora. Hindee.	Petha kalabuntha. Tamul.

The species of Agave, commonly called aloe plants, are natives of America, which have become so naturalised in many parts as to appear to be indigenous in Africa, parts of India, and in the south of Spain. So much is the latter the case, that some authors take this American plant to be the aloe wood mentioned in Scripture. But there is not the slightest foundation for this opinion, nor indeed for the true aloe plants, of which the agaves so frequently assume the name. The 'Aloes wood' of Scripture is the *Ahila* wood of the East, so famed for its fragrance, yielded by *Aquilaria Agallochum*, &c., (*v. Ahalim* by Dr. Royle, in Kitto's, 'Cycl. of Biblical Literature,' i, p. 90.)] But, as they also yield some fibre, it is better to retain for them their appropriate name of Aloe. The Agave plants, to which the name of American aloes is so frequently applied, resemble the true aloes in their sword-shaped leaves with parallel veins, which, however, grow to a gigantic size—that is, from eight to ten feet in length—in a cluster from the root, with their margins usually armed with short thorns, and their points with a hard and sharp thorn. This makes these plants so useful in the construction of hedges ; a use to which they are applied in the south of Spain and of Italy, as also in Sicily. These plants come to perfection in about three years, though they do not flower for eight, and, in some situations, perhaps not for twenty years, when they throw up a tall candelabra-like flower stalk. This has, no doubt, given origin to the fable of their flowering only once in a hundred years. It is the leaves of these plants which abound in fibres of great length, and of considerable strength. Being also tough and durable, they are separated for the purpose of making string and rope, not only in their native coun tries, but also in those into which they have bee introduced. Dr. Royle, in his 'Illustrations o Himalayan Botany' (p. 375), observed, respect ing these plants : "The species of agave are no only ornamental as plants, and useful as hedges but are important for their products. The roots, a well as leaves, contain ligneous fibre (*pita thread* useful for various purposes : these are separate by bruising in water, and afterwards beating practices which the natives of India have adopted, either from instruction or original observation. The Mexicans also made their paper o the fibres of agave leaves laid in layers. Th expressed juice of the leaves evaporated, i stated by Long, in his 'History of Jamaica to be also useful as a substitute for soa But the most important product of agav and especially *A. americana*, the specie now most common in the South of Europe, i the sap, which exudes upon the cutting out of the inner leaves, just before the flower scape is ready to burst forth; of this a very full account is given by the illustrious Humboldt, in his 'Political History of New Spain' (book iv, c. 9). The fibres of these Agave leaves are, in Mexico, converted into twine, cord, or rope; the last used in mines, and on the western coast, towards Guayaquill, for the rigging of ships. Humboldt describes a bridge over the River Chambo, in Quito, 131 feet in span, of which the main ropes, four inches in diameter, were made of the agave; and upon these ropes the road-way was placed. In the West Indies, the negroes are described as making ropes, fishing-nets, and hammocks of agave fibres. The fibre is thus prepared: the longest and most perfect leaves being cut off, are laid upon a board and scraped with a square iron bar, which is held in both hands, until all the juice and pulp are pressed out, the fibres only remaining. Stedman says, the fibre is like white silk, and hence it obtains the name of silk-grass; though this seems to be also applied to the fine fibres of *Agave vivipara*, and of *A. yuccæfolia*. But others of these white endogenous fibres are better entitled to the name, as they are softer and more flexible. Stedman says, ropes made of this material are stronger than any in use in England; but that they are liable to be sooner damaged by immersion in water. In Portugal the fibre is called *filo de pita*, and applied to various purposes. In Spain also, the fibre is called Pita, and used for making string and rope, the plant being abundant in the southern provinces. In Sicily, the fibre is said, by Dr. Balfour, to be called Zambarone, where cordage and mats are made of it. Pita fibre is extensively used in South America for even considerably sized rope.

Pita fibre and rope have been stated to be prepared from the Agave so common in the south of Spain, though not to the extent at which the manufactory might easily be carried on. M. Romon de la Sagra recommends the introduction of other kinds from Guatimala and Columbia, which are known there by the names of "Cabulla" and "Cocaiza." Species of Fourcroya also yield excellent fibre. *F. gigantea* is common at St. Helena and has been introduced into Madras. Pita fibre was sent to the Exhibition of 1851 from the island of Madeira, and also from Barbadoes and Demerara. Thread and paper made from *Agave americana* were also sent from Mexico, and fibre is also said to be obtained there from a species called "*Moogai*"—*Agave diacantha* by botanists.

The name Pita seems to be also applied to similar fibres obtained from species of Bromelia and of Yucca, as well as of Agave, according to Dr. Hamilton, of Plymouth and it is probable that it is so, for these are all very similar to each other. Dr. Hamilton further states, that the weight of Pita fibre being one sixth less than that of hemp, the difference would be very considerable for the entire rigging of a ship and produce a sensible reduction in the top weight, and thus increase the stability of the hull. He considers it also more durable than hemp, and that it bears the alternate action of humidity and of dryness with little injury; hence it is preferred for cables, standing rigging of vessels, nets for fishing, &c. The difference in hygrometric action is also in favour of the Pita. In a few months' trial in H.M.S. Portland, a log-line, 300 feet long, of Pita, contracted sixteen feet two tenths, whilst a similar one made of hemp, contracted twenty-one feet six tenths; the contraction, moreover, of the Pita ceased the third day, while that of hempen cord continued the whole time. The two lines have been deposited in the stores of the dockyard at Plymouth. At Amboyna, says Labillardiere, the natives produce threads from the bastard Aloe, called *Agave vivipara*: the master of the house went and cut a leaf off this plant, and, resting it on his thigh, in order to scrape it with his large knife, he took off its pulp, and obtained from it a fascicle of threads as long as the leaf, and as strong as those of our best hemp. The Agave grows well on the north coast of Africa, and its fibre has been paid much attention to by the French since their occupation of Algeria. There, it is stated, when fodder is scarce, cattle will eat the younger leaves when cut into transverse slices. A clock and paper made of this fibre were sent to the Exhibition of 1851; and ropes have been made of the fibres—of these the strength is very considerable. The Agave or Pita fibre being so extensively employed in different parts of the world, there is no doubt that it would be a valuable culture for many parts of India. It was probably introduced into India by the Portuguese, and is now common in both the northern and southern parts of India. The species which D. Royle found most common in the north-west of India was *Agave vivipara*. This seems to be the same as the *Ag[illegible] americana* of Roxburgh ('Herb Amb.,' v, 94). He observed that on rich soils, the plant invariably produced bulbs, but no seeds, while on a poor stony soil and dry climate, like that of Delhi, seeds alone are produced. This species must be closely allied to the *A. cantala* of Dr. Roxburgh, which is, no doubt, a naturalised plant. These species or varieties flourish in dry parts of the country, where few fibre-yielding plants succeed so well, such as in the Deccan and in Mysore. Far in the north-west, the outer hedge of the Saharunpore Botanic Garden was formed of the Agave, and the fibres were commonly used for all garden purposes. Dr. Buchanan, at the beginning of the century, found the villagers in Mysore employing it for making strong hedges, and separating the fibres for cordage; and Mr. Webb, who was employed with Dr. Anderson in cultivating the Nopal for the Cochineal insect, had a plantation of the Agave, near Madras. Of this the fibres were made into rope, and reported upon at the arsenal of Fort. St. George, as long since as the year 1798. Mr. William Webb having made a plantation of the Agave plant, in the year 1798 manufactured ropes from its fibres, which he considered superior in a strength to that made in Europe. He also stated that he believed rope without tar to be preferable for all military purposes. He submitted a coil of this rope to the Military Board of Fort St. George, with a suggestion that he should be allowed to supply it in lieu of rope made in Europe. Capt. P. Malcolm, of H. M. S. Suffolk, writing from Cochin, reported upon it, "as strong, if not more so, than Coir, and as having the advantage in pliability." A Committee of the Military Board were "of opinion, that its appearance promises well, and that from a trial that has been made of it, it is at least equal when new to the best Europe rope of the same size in point of strength. Sixteen of the battering guns having been mounted with it before it gave way, while Europe rope of a larger kind failed after it had been employed in mounting only four guns." But it was observed that the yarns were made too large, and that diminishing their size would augment their strength. With respect to its durability, the Committee had no experience, but report that a coil which Mr. Webb stated "had been fixed to the anchor of his boat at Ennore, and kept constantly under water for six months, appear to have undergone no other alteration than Europe rope would have done in the same situation." In another report made by the Commissary of Stores, Fort St. George, dated 27th July, 1801, on a coil of Aloe rope manufactured at Seringaptam, it is stated that "the coil of Aloe rope was, on its being received at the Arsenal, the 10th of June, immersed in a tub of water for twenty-four hours, and then exposed to the open air in the yard; since which date, a few showers of rain have f[illegible]n, after each of which the coil was turned; and upon being examined and tried the 27th instant, it was found to be quite rotten." From this it was inferred that Aloe rope will not stand wet; and it was stated that this was also the result of similar rope supplied to H M.'s squadron then in India. ('Madras Artillery Records' for 1839.) Though nothing is so objectionable in a rope for naval purposes as inability to bear exposure to wet, the above experiments are inconclusive, because we are without any information respecting the species of Agave which was cultivated, and also respecting the soil and climate where it was grown, as well as the time which the fibre was macerated before it was separated. All which influence not only the strength of fibre, but its capability of bearing moisture. The result of the experience in India is moreover, contrary to that of South America. The employment of the fibres of this plant seems very general, as it has since become widely distributed through the Madras Presidency. Thus it is so employed at Masulipatam and at Bellary. At Cuddapah, the natives make ropes of it thirty cubits in length. The plant is abundant about Madura, whence fibre and cordage were sent. The fibres are prepared by pressing the leaves between two horns and then washing the pulp away. The ropes are described as being manufactured in great abundance, and at trifling expense; and that they are much used for lashing bales of calico. The fibres are also separated on the Malabar coast, and specimens were sent from the prisoners in the jail. But the most varied assortment of specimens was sent from Madras, prepared at the instigation of Dr. Hunter in his School of Arts, and by the prisoners in the Jails at Madras. Of these, the Agave was in the state both of fibre and of oakum; also made into string, cord, and rope, and dyed orange, red, maroon, and green, showing how well this fibre takes these colours. Also, some good paper, made with this fibre, mixed with that of gunny bags. In Madras, this plant is called *petha kalabuntha.* The usual way of preparing these fibres is to steep them in water for three days, and then to clear away the herbaceous parts. But the best way of steeping is that practised by the natives in some places; that is, of sinking the leaves in wet sand. But the fibres may also be separated by first beating, and then scraping away the rest of the vegetable tissue. The beating is required on account of the hardness o these agave leaves. Pressing them throug grooved cylinders, would, no doubt, be efficacious and also expeditious. The Agave is also common in the Bengal Presidency, where i is called *cantala;* and also *bans keora*, or "Bamboo Pandanus." Though, probably most valuable in the upper provinces, yet, in December, 1839, Mr. Bond, master-attendant a Balasore, sent to the Agricultural Society of Calcutta, a pieces of cloth manufactured by him from a species of the Aloe plant, of which h sent a leaf; and stated that the cloth had bee woven without the thread having been spun. A already mentioned the fibre was constantly employed for garden purposes at Saharunpore. Mr Tonnochy, B. C. S., succeeded in spreading th culture in the Boolundshuhur district, by exposing, in his office, some of the dressed fibre, an also a couple of sattranjees or carpets made them, together with heaps of seed. These a disappeared. Mr. Tonnochy encouraged the cu ture as a hedge plant, because it was not onl valuable on its own account, but also, becaus enclosing the fields so much enhances the valu of land. The long, flowering stem was, moreover, found useful as a ridge-pole for cottages. In the year 1852, Sir R. C. Hamilton, resident at Indore, forwarded some specimens of the fibre of the *Agave Cantala* which grows freely in Malwa, and to which attention had been directed during the temporary want of "Bakkul," the fibrous bark of the roots of certain trees, which is used in that part of India as a cheap substitute for string and cord. Dr. Tranter found he could pull out single fibres, measuring from twenty to thirty inches in length; but he separated a larger quantity by macerating the leaves in water for a week and then beating them with a stick. Capt. A. Thompson, of Messrs. T.'s rope-manufactory at Calcutta, having tested the fibres, found the strength quite equal to the best Russian hemp. He also states, in June, 1852, that a considerable quantity of fibre, exactly similar, had lately been imported from the Malabar coast, and that he had some made into rope, which very much resembled Manilla rope: but time was required to test its durability. It was then worth about four rupees per bazar maund in the Calcutta market. Though this Pita or Agave fibre is so much employed in different parts of the world, its great merits seem to be, generally, but little known. We have seen that in South America, ropes made with it are considered both strong and durable. The ropes made at Algiers have been found to possess great strength; and the log-lines in H. M. ship Portland to be both durable and not shrinking after the third lay. In lightness and colour they resemble ropes of Manilla hemp, though they are not usually so strong. But in a "comparative trial made at Paris, between ropes made of hemp and of the aloe from Algiers, the latter was found to bear 2,000 kilogrammes, while the former, of equal size, bore only 400." So, in some comparative trials made at the French dock yard at Toulon, on ropes made from these fibres and from hemp, the following results were obtained, both being immersed in the sea for six months, and exposed to the atmosphere for the same time.

PITA.	Weight supported.	HEMP.	Weight supported.	Difference in favour of Pita.
	Pounds.		Pounds.	Pounds.
Plunged in sea, ...	3,810	Plunged in sea, ...	2,538	1,272
Exposed to air, ...	3,721	Exposed to air, ...	3,022	702

In the year 1841 some rope was made under the direction of Mr. Hornby at the Allipore Jail rope-walk, of Aloe, or rather Agave fibre, obtained from plants which had been grown by the convalescent insane, near Calcutta. Mr. Hornby tested this rope against others made of Country Hemp (that is *Sunn*), Jute, and Coir, and he found the Agave rope exceed the others in strength, as appears from the following statement sent by him to the Agricultural Society of India:

CALCULATION OF THE POWERS OF ALOE FIBRE ROPE, COUNTRY HEMP, JUTE, AND COIR ROPE, TRIED AT THE ALLIPORE JAIL ROPE-WALK.

			lb. Troy.
Aloe Fibre Rope, 1 fathom long, and 3 inches in circumference, broke in a weight of...	...	...	$2519\frac{1}{4}$
Coir	do.	do.	do. 2175
Country Hemp	do.	do.	do. $2269\frac{1}{2}$
Jute	do.	do.	do. $2156\frac{1}{2}$

In some experiments made by Dr. Royle, he found a bundle of the fibres bore 270 lb., while a similar bundle of Russian hemp bore only 160 lb. Dr. Wight had some cord prepared with the Agave fibre in Coimbatore, and found it bore 362 lb.; when similar rope, made from Crotolaria juncea broke with 407 lb. The following are the results of—

EXPERIMENTS MADE IN THE ARSENAL AT FORT ST. GEORGE, JULY 30TH, 1850, ON ROPES MADE IN JAIL AT MADRAS, IN 1850. For similar experiments on rope, &c. made from plantain fibres, see FIBRES.

	Circumference.	Length.	Weight required to break.	After 24 hours in water, and used 7 days after.	Immersed in water 10 days and dried.	Manilla Rope.	English Hemp Rope.	Weight of one fathom of each.		
								Pita.	Manilla.	Europe.
	In.	Fms.	lb.	lb.	lb.	lb.	lb.	oz.	oz.	oz.
Rope, ...	$1\frac{7}{8}$	2	2218	1994	2016	—	—	$19\frac{11}{16}$	—	—
Ditto, ...	$1\frac{3}{4}$	2	1154	—	—	1490	1184	$8\frac{14}{16}$	$9\frac{1}{2}$	13
Line, ...	$0\frac{3}{8}$	1	$86\frac{1}{4}$	—	—	—	—	$0\frac{7}{16}$	—	—
Cord, ...	$0\frac{3}{16}$	1	$39\frac{1}{2}$	$34\frac{1}{3}$	$37\frac{14}{16}$	—	—	$0\frac{2}{16}$	—	—

These experiments prove incontestibly, that the Pita fibre is possessed of very useful properties; and we have seen that the Agave plant has become naturalised in many widely separated parts of the Indian territories. Its characteristics have been dwelt upon in detail, because it seems calculated to prove extremely useful in India.

First, because it grows in dry climates and poor soils, such as may be met with both in the Deccan and in Mysore. It will, in such situations form a very effective hedge—useful, not only in keeping off from the crops the innumerable herds of deer, &c, but also in assisting in saving the soil, a road or a railway, from being covered with the sand blown from the desert. The leaves would form a continual source of employment for the people, in separating an abundant supply of material for cordage. This will, at all events, be sufficiently good for all agricultural purposes, for the harnessing of cattle, the baling of produce, and for the rigging of vessels employed in river navigation. The fibre is also sufficiently good to form an exportable article of considerable value, especially as the prejudice against white cordage will by degrees be removed, and the two will be invaluable for the manufacture of paper. It is desirable that some comparative experiments should be made on the age at which the leaves should be collected, and on how long they should be steeped. Also, whether this process is necessary at all; that is, whether the fibre may not be separated by mechanical means. The climate best suited to the growth of the strongest fibre should be ascertained, as well as what are the differences of quality between the fibre of different species of Agave. Also, the susceptibility of different kinds to the effects of moisture, either with or without superficial tarring. In the preparation of the cordage submitted to trial, care should be taken that the fibres are so prepared as to cut each other as little as possible when tested; and also that the cordage is made by a regular rope-maker.—*Royle, Fib. Pl. p.* 4.

(6389) PITCH.

Poix, Fr.
Pech, Ger.
Pitch, Guz. & Hind.
Pece, It.
Smola-gust aja Rus.
Pez, Sp.

The residuum which remains on inspissating tar, or boiling it down to dryness. It is extensively used in ship-building, and for many other purposes.—*McCulloch. Faulkner.*

(6390) PITCH BLENDE. A ponderous metalliferous ore, of a blackish colour, much valued by porcelain painters. Localities, Saxony, Bohemia, Hungary, and Cornwall.—*Waterston. Faulkner.*

(6391) PITH MODELS. The Trichinopoly Local Committee exhibited a large collection of figures and architectural models, carved in the Pith of the Typha. The attitudes of the figures are stiff but the draperies are characteristic. The figures introduced into the model of the Trichinopoly Fort are out of proportion being far too large for the scale of the buildings.

Pith Models of Pagodas.................. } Trichinopoly and Salem.
Pith work made from the rushes called "Nultee"................ } Tanjore.
Model of the Pagoda.

(6392) PITTA, M. Vieillot's name for a genus of remarkable birds, placed by Mr. Swainson among the *Myiotherinæ*, or Ant-Thrushes. [Merulidæ.] *Eng. Cyc.*

Pitta (Vieill., Temm.).—M. Lesson remarks that, under the name of *Myiothera*, Illiger and Cuvier united the Brèves of Buffon and the Ant-Thrushes properly so called. These Brèves are remarkable, he observes, for the livid colours of their plumage, their long legs, and their very short tail. They are only found, he adds, in the Malaisian Islands, whilst the Ant-Thrushes belong to the New Continent as well as to the Old World. Mr. Swainson notices the genus *Pitta* as one of remarkable beauty, and observes that they have the gradually-curved bill of the true Thrushes, but much stronger.—*Eng. Cyc.*

(6393) PITTA GIGAS, Brève Geant, or Giant Pitta. Size equal to that of a magpie, but the tail is short and squared, and the wings cover it entirely. A very brilliant azure-blue covers the back, the scapulars, the rump, and tail; a less vivid tint is spread over the wings, the quills of which are black, covered with azure towards the tips; summit of the head, nape, and demi-collar of the lower part of the neck black; feathers of the front and eye-brows ashy-brown; throat whitish; an ashy-brown tint is spread over all the lower parts; the feet are very long and of a horny-ash colour. Total length 9 inches. It is found in Sumatra. (Temminck.) —*Eng. Cyc.*

Chlorisoma thalassinum (*Kitta thalassina, Piroll Thalasin*, Temm.). Greater part of the plumage very brilliant celadon-green; a velvety black band springs at the angle of the bill, passes backwards so as to include the eye, and surrounds the occiput; tail deep tarnished green; wings reddish, but the three or four secondary feathers nearest the body are opaline bluish-ash; iris, bill, and feet, very bright vermilion-red. Total length 11 inches 2 or 3 lines. The male and female have nearly the same livery. The young of the year differ in the colour of their bill and feet, which are black; in that of the wings, which is a tarnished rusty-red, and in the very clear blue, which is nearly whitish, of all the rest of the plumage. This blue tint is more vivid in middle age, and passes by degrees from bright azure-blue to celadon-green. Individuals during moult have the plumage varied with these two tints very vivid and pure. It is a native of Java and Sumatra. (Temminck.)—*Eng. Cyc.*

(6394) PLANKS.

Planker, Dan.
Planken, Dut.
Planches, Fr.
Planken, Ger.
Tukhta, Guz. Hind.
Tolstule-closku, Rus.
Plankor, Sw.

A term applied to thick strong boards, cut from various kinds of wood.—*Faulkner.*

(6395) PLANTAGO, a genus of Plants, the type of the natural order *Plantaginaceæ*. It has a 4-cleft calyx, a corolla with an ovate tube, and a 4-parted reflexed limb. The capsules burst transversely; they are 2-4 celled, and have from 2 to 4 seeds. The seeds of *P. Ispaghula* are of a very cooling nature, and with boiling water form a rich mucilage, which is much used in India in catarrh, gonorrhœa, and nephritic affections. Soda is obtained in Egypt from the ashes of *P. squarrosa.*—*Eng. Cyc.*

(6396) PLANTAGO ISPAGHULA.

Ispagool, Pers.
Buzr-kaloona, Arab.
Fushoon, Greek.

In India the Plantago Ispaghula is cultivated during the cold season for the seeds, which are used as an emollient and light article of diet for convalescents.—*O'Shaughnessy, page* 510. In making a decoction of Ispaghool take of Ispaghool seeds two drachms, distilled water one pint. Boil and strain. This preparation is a simple demulcent. That of Isphaghool is used in dysenteries, and recommended by Mr. Twining. —*Bengal. Phar. p.* 277.

(6397) PLANTAINS, Banana.

Biyu, Bali.
Kehl-kang, Cyng.
Kayla Guz. Hind.
Gadaug, Jav.
Pesang, Mal.
Ng-hyet-Praw, Burm.
Kudali, Sans,
Valiepullum, Tam.
Arietie pundoo, Tel.
Faulkner-
Vellacoy, Maleal.

It is probable that the plantain and the banana are merely varieties, indeed that all the plantains are derivable from one species, the Musa sapientum, also called M. paradisiaca, the original of which is the wild Musa. The Musa is found in all tropical countries, and in India the common edible varieties flourish in the poorest of soils, from the most northern parts of India to Cape Comorin, and from the sea shore to elevations of 7000 feet. M. Coccinea M. Cavendishii are found in China. M. Glauca is indigenous in the Malayan Peninsula. M. Ornata in Chittagong. M. Superba is found in the valleys of the south of the Peninsula, and of the mountains at Dindigal. The varieties cultivated in Southern India, *Rustaley, Poovaley, Payvalley, Monlen, Shevalley, and Putchey valley*, are to be found in most bazars. The plantain is one of the most useful of plants; in some countries supplies the place of bread and forms the chief nutriment of the people; its ripe fruit is eaten everywhere in India as a delicacy, and is also made into preserves. The farinaceous parts can be separated in the form of flour. The shoots or tops of young plants are given as fodder for sheep and cattle and are said to be a delicate edible. The leaves serve for thatch and bedding and the stem yields valuable fibres. Humboldt has calculated that the same amount of ground planted with the Banana will support a far greater number of people than when planted with wheat, but the productiveness according to the following statements differs with the mean temperature. Professor Johnston being the authority for the yield of dry food.

	Temperature.	Produce of Plantains per Imperial acre.	Or of Dry Food per acre.
	Fah.	tons.	tons.
In Warm Regions,	81½	72	19½ Humboldt.
At Cacua,.........	78⅘	59	16 Gondot.
At Hague, ...	71⅔	25	6¾ Boussingault.

In South America, Mexico and in Bombay, the fruit cut into slices and dried in the sun, and packed in the leaves of the plant forms an article of trade; they can also be baked, and in this state the sugar on the fruit is sufficient to preserve them for years; in the process of drying, the plantain is taken when fully ripe and laid in light cane frames exposed to the sun. When shrivelling commences the skin is peeled off, after which the drying process is completed, and the fruit is pressed with masses for the convenience of transport: in the moist climates of India it would be necessary to bake them in ovens. In 1850-51, 267 cwt., valued at Rs. 1456, were exported from Bombay to Cu'ch and Guzerat. The several varieties of the edible plantain which are known and cultivated throughout the West Indies, Africa, and in the East, are all reducible to two classes, viz., the Plantain and the Banana (*Musa Paradisiaca* and *sapientum*). The difference between these two plants is even so slight as to be scarcely specific; it is therefore most probable that there was originally but one stock, from which they have, by cultivation and change of locality, been derived. The plantain and its varieties invariably bear male, female and hermaphrodite flowers within the same spathe, all of them being imperfect and consequently unproductive of seed. An individual may, even from excess of culture, moisture, &c., be entirely incapable of flowering. During the prevalence of a disease or blight among the plantain walks of Demerara in the years 1844 and 1855, it was seriously proposed to introduce male plantains, or obtain fresh stock by seed. It was therefore, necessary to determine with exactness, if possible, whether the Plantain or Banana, (whichever be the parent stock) exists anywhere at present, or has been known to have existed as a perfect plant, that is bearing fertile seeds; or, whether it has always existed in the imperfect state, that is,incapable of being procreated by seed the only state in which it at present exists in our colonies. Linnæus conjectured (Spec. Plant, 1763) that the "Bihai" (*Heliconia humilis*), a native of Caraccas, which produces fertile seeds, was the stock plant of the plantain; but the existence of a wild seed-bearing plantain, renders it unnecessary to pursue that speculation. The banana, from time immemorial, has been the food of the philosophers and sages of the East, and almost all travellers throughout the tropics have described these plants exactly as they are known to us, either as sweet fruit eaten raw, or a farinaceous vegetable roasted or boiled. The foliage of the plantain affords food and bedding, and is used for thatch, making paper, and basket making; and from its petioles is obtained a fine and durable thread. The tops of the young plants are eaten as a delicate vegetable; the fermented juice of the trunk produces an agreeable wine. The abundance and excellence of the nutritive food which the plants of this valuable genus supply are well known; but of the numerous uses to which they are applied I may mention the following:—The fruit is served up both raw and stewed; slices fried are also considered a delicacy. Plantains are sometimes boiled and eaten with salt meat, and pounded and made into puddings, and used in various other ways. In their ripe state these fruits contain much starchy matter. From their spurious stems, the fibres of the spiral vessels may be pulled out in such quantity as to be used for tinder. *M. textilis* yelds a fibre which is used in the manufacture of fine muslins, and the coarser woody tissue is exported in large quantities from Manila, under the name white rope or Manila hemp. Horses, cattle, swine, and other domestic animals are fed upon the fruit, leaves, and succulent trunks. The same extent of ground which in wheat would only maintain two persons, will under the banana yield sustenance to fifty. That eminent naturalist and elegant writer, the Baron Von Humboldt, states ("Political Essay on New Spain," vol. ii.) that an acre of land cultivated with plantains produces nearly twenty times as much food as the like space sown with corn in Europe. He refers to a place in Venezuela, where the most careful tillage was rendered to a piece of land, yielding produce supporting a humble population residing in huts, each placed in the centre of an enclosure, growing the sugar cane, Indian corn, the Papaw tree, and the Musa—a tropical garden!—upon 'the elaborate culture of which a whole family relied for subsistence. Lindley enumerates ten species of Musa, some of which grow to the height of 25 or 30 feet, but the valuable species *M. Cavendishii*, does not grow more than four or five feet high. The bananas of the family of the Musaceæ, appear to be natives of the southern portion of the Asiatic continent (R. Brown, "Bot. o Congo," p. 51). Transplanted at an unknown epoch' into the Indian Archipelago and Africa, they have spread also into the New World, and in general into all intertropical countries, sometimes before the arrival of Europeans. According to Humboldt it affords, in a given extent o ground, forty-four times more nutritive matte than the potato, and 133 times more than wheat These figures must be considered as only approximative, since nothing is more difficult than t estimate the nutritive qualities of different aliments. The plantain may be deemed the mos valuable of fruits, since it will, in some measure supply the place of grain in time of scarcity To the negroes in the West India Islands th plantain is invaluable, and, like bread to th Europeans, is with them denominated the staff o life. In Jamaica, Demerara, Trinidad, and othe principal colonies, many thousand acres are planted with these trees. The vegetation of this tre is so rapid that if a line of thread be draw across, and on a level with the top of one of th leaves, when it begins to expand, it will be seen in the course of an hour, to have grown nearly a inch. The fruit when ripe is of a pal yellow, about a foot in length and tw inches thick, and is produced in bunches s large as each to weigh 40 lbs. and upwards In the Straits' settlements of the East, the following are the most approved varieties:—Th royal plantain, which fruits in eight months one which bears in a year, the milk plantain, th downy plantain, and the golden plantain or banana. A species termed *Guindy* has been latel imported from Madras, where it is in great request. It has this advantage over the othe kinds, that it can be stewed down like an appl while they remain tough. The Malays alleg that they can produce new varieties, by planting three shoots of different sorts together, an by cutting the shoots down to the ground thre successive times, when they have reached th height of nine or ten inches. In some district of Mexico it is, indeed, dried in the sun, and i this state forms a considerable article of interna commerce under the name of "plantado pasado." When dried, and reduced to the state of meal, i cannot, like wheat flour, be manufactured int maccaroni or vermicelli, or at least the maccaroni made from it falls to powder when put int hot water. The fresh plantain, however, whe boiled whole, forms a pretty dense firm mass, o greater consistency and toughness than the potato. The mass, beaten in a mortar, constitute the *foo-foo* of the negroes. The plantain mea cannot be got into this state unless by mixin it up with water to form a stiff dough, an then boiling it in shapes or bound in cloths The advantages to the paper manufacturers i employing the prepared fibre instead of rags, wil be numerous, for the fibre is equal in texture clean, and aromatic ; whilst rags are dirty, full of vermin, and very often pestilential. A large tock of the plantain can always be secured, without fear of its being injured by keeping. The paper will be superior to that made of rags, nd the process of making it will be more economical, inasmuch as the *sorting* of the material will not be required. Another advantage is, hat a new article of commerce will be opened or the benefit of the colonial shipping interests nd a stimulus will be given to the cultivation of fruit which is the favorite food of large masses f the population. The following is a "specication" of articles requisite for making three ons of prepared fibre in a day:—Four wooden oilers lined with lead, in the form of coolers, 7 et deep by 6 in diameter. One hydraulic ress, from 400 to 500 tons. One stout screw ress, to compress the fibre before it is submited to the hydraulic press. One iron mill with orizontal cylinders. Six waggons; twenty mules. Utensils, such as spatulas, cutlasses, oes, rakes, &c. &c. One lever, to take out the bre from the boilers. One steam boiler, equal o 12-horse power, to steam the four wooden oilers. It being very desirable that the works hould be in the immediate neighbourhood of a iver, the machinery should be worked by water-ower ; but if this mode should be inconvenient, steam engine in addition must be obtained, of bout 8 or 10-horse power ; or if one steam ngine of 20-horse power were employed, it ould be sufficient for all purposes. Thirty men re required to make three tons of fibre in a day.—*immonds.* Although perhaps there is no province India in which plantains are grown to so great n extent as in Pegu, yet there are scarcely any ood plantains to be had in the country. This s owing to the Burmese habit of only eating reen fruit, and their total indifference to the ner qualities of flavor. The great use of all ruit with the Burmese is to serve as an addion to their curry, for which purpose one ind of plantain is just as good as another. ut now that a market is opened for the etter description of this and other kinds f fruit, the introduction of a good stock ecomes desirable.—*McClelland.* The plantain r banana, though a far less palatable fruit, olds the same place in Tenasserim that e apple does in England, and the United tates. It is used as a vegetable as well as an rticle for the dessert, the great proportion being aten with rice and meat in the place of potatoes. here is perhaps no plant of which so many preosterous things have been carelessly written in ooks of travels, and then copied into works of raver character, than this. Among other things qually veritable, it is said, "Three dozen planins are sufficient to serve one man for a week nstead of bread, and will support him much beter." A Karen by me says he often eats ten at a time, and a hundred would not be sufficient for a man one day if he had nothing else, unless they were very large. Like the mango, the tree is indigenous, but the wild fruit is too full of seeds to be eatable. The plantain and banana, which were formerly regarded as distinct, are now considered by botanists as one species, but it embraces many varieties ; I have, says Mr. Mason, the Burman names of *twenty-five* before me. "The numerous varieties," writes Voigt, "we have in vain tried to put in some order. The attempt made for this purpose, in Schultens, appears to us to have only increased the confusion." The *Manila hemp*, from which a fabric of the finest texture is prepared, is made from the leaves of a species of plantain tree, *M. textilis.* Another distinct species of this genus grows wild in Tenasserim jungles, and is rather an ornamental plant, which is all that it has to recommend it. Unlike the common plantain it never throws up shoots from its roots. The name of the plantain in Pali is *manza*, which is its Arabic name, *mauz*, with a final vowel added, to pronounce the last consonant, no words in Pali, ending in any consonant excepting *n*. Now if its Arabic name be so widely diffused, it seems quite certain that had the plant been known to the Hebrews, the Hebrew being cognate with Arabic, it would have had a similar name. This fact is a sufficient refutation of the *conjectural* interpretations of certain passages of Scripture that we meet with from time to time. Thus : "Loudolf's conjecture that *dudaim* (mandrakes) were the fruit of *Musa paradisiaca*, (plantain-tree,)" which has been recently revived in a modern work, cannot stand, on account of its name. For the same reason, the conjecture that the grapes which the spies brought from Canaan, were plantains, cannot be sustained. The plantain seems a favorite plant to build fancies upon, Gesenius in defining ***teenah***, the fig tree, refers to Gen. 3.7, "Where," he says, "the *Ficus indica* or ***Musa paradisiaca***, plantain tree, Engl. with very large leaves seems to be meant." This is perfectly conjectural and is wholly unsustained by the usage of the word,as well as that it bears no resemblance to its Arabic name.—*Mason.* See MUSA.

(6398) PLANTAIN LEAVES, MUSA PARADISIACA. Lin.

Valei elley, TAM.	Maoz ka pat, DUK.

These leaves are used in regimental hospitals, for dressing parts that have been blistered, and men's backs, after punishment.—*Ains. Mat. Med. p.* 191.

(6399) PLANTAIN MEAL, is prepared by stripping off the husk, slicing and thoroughly drying the core in the sun, after which it is powdered and sifted. It has a fragrant odour—and its flavour is said to depend a good deal on the rapidity by which the slices are dried. It should be husked and sliced by nickel or bamboo knives, as those of steel knives injures the colour of the meal. It is calculated that the fresh plantain will yield 40 per cent of meal, and that an average bunch of 25 lbs. weight will yield 5 lbs. and that an acre of plantain walk of average quality producing 450 bunches during the year, would yield upwards of a ton of meal : In the West Indies plantain meal is largely employed as the food of infants, children and convalescents. In composition the plantain fruit approaches most nearly, in nutritive quality to the potato, and the meal of the plant to that of rice : the following are the proportions of Starch, Sugar &c. and protein compounds, on which depend their nutritive quality.

	Rice.	Potato.	Plantain.
Starch Sugar &c.	87·4	79·0	86·0
Protein Compounds.	7·5	8·0	5·2

—*Simmonds.* Plantain Meal has attracted notice in England. The nutritive quality of this substance, and its chemical composition are found to approach very closely to that of rice. There can be no doubt therefore of the value of this meal, and of the benefit of preparing it, whenever the fruit is produced in larger quantities than it can be consumed.—*M.E.J.R.* See MUSA.

(6400) PLANTAIN SKINS, MUSA PARADISIACA.

Valei palum tole, TAM.

These, as also lime skins, are used by the chucklers in dying leather black.—*Ains. Mat. Med. p.* 129.

(6041) PLANTAIN FIBRE. Almost every part of the plantain, may be converted into fibre, but it most abounds in the stem and leaves, and can be made available for textile or cordage purposes. The combings or tow separated during the preparation of the fibres is of value as a substitute for horse hair, for stuffing mattrasses &c. and the peduncle of the core can be pounded into half stuff for the paper makers and forms an excellent material for the finest or the toughest kinds of paper. While in the West Indies the spiral vessels are employed as tinder. In the process of separation, the stem should be cut down six inches above the ground, and then divided longitudinally into four parts, and the juice expelled by passing each slip longitudinally through the common sugar mill with grooved hard wood rollers, or a mill the rollers of which are three feet long and one foot in diameter. In the process of crushing, the stalks and the harder and softer parts of the stem should be passed through separately, which can be easily effected if the rollers be horizontal. In this way, the produce will be four or five pounds of fibre from each tree. The fibres from the midrib of the leaf are the best, and in general if the stem yield four pound nett of fibre the stalk will give 1 lb. out of four. After the crushing, the fibres are to be well washed and boiled in soda or othe alkaline ley to separate the glutin and coloring matter, keeping the fibres from the several parts. quite separate, in this process of boiling. They are then bleached and the highest colored fibre do not require more than six hours, but the darkest, from twelve to eighteen. The fibre from th stem, is fine white and silky, of considerabl length ; specifically lighter than Hemp, Flax an Aloe fibre, by $\frac{1}{4}$th or $\frac{1}{5}$th and possessing considerable strength. The fibre of this plan rapidly rots and becomes stiff, brittle and discolored by steeping in the green state, and i has been ascertained by trial that the strengt is in proportion to the cleanness of the fibre. I it has been well cleaned, and all the sap quickl removed, it bears immersion in water as well a most other fibres, and has about the same strengt as Russian Hemp. The coarse large fruited plan tains yield the strongest and thickest fibres ; th smaller varieties are suited for weaving, and i carefully prepared, these have a glossy appear ance, like silk. But this glossy appearanc can only be got by rapid cleaning, before th sap has time to stain the fibres, and it is los soon if the plant be steeped in water. I yields an excellent substitute for hemp or line thread ; it can be made into string line or rope and manufactured into cloth. The fine grass cloth ship's cordage, and ropes used in the south se Whale fisheries, are said to be made from th fibres of varieties of Musa. As in all the plan tain tribe, the leaves yield the thickest and strong est fibres. Though hitherto little employed, ther can be no doubt that it is the most conspicuou amongst the fibrous plants of India. It contain a valuable fibre. It is every where cultivated i India for its fruit, an article of universal con sumption by the native population, and the ste can always be had in abundance for it. It is tree which bears fruit only once, and as soon a the fruit has been removed it is cut down. The will therefore be no difficulty in obtaining fro this plant alone, a large quantity of fibre of valu able quality, applicable to every species of cloth or other articles usually made from flax or hem and of equal quality. The finest plantain fib when carefully cleaned and dressed, in what ma be termed the "fresh process," in contradis tinction to the system of rotting the fibre free, has been said to be well suited for th imitation of silk in carriage braid and carpe work. The average value put upon such fibre was said to be £70 per ton, when Russian hem was selling at £50 per ton. In the West In dies, the total expense of producing a ton o fibres, is calculated at £9 13. 4. It seems wort consideration whether the wild, and at presen useless plantains, growing along the foot of th Himalayas and on the Neilgherries may no yield a stronger fibre than any of the cultivate kinds. The wild fruit is not edible, from its containing many seeds, on the Arracan coast, he layers of the stem of the plantain, termed here *Pa-tha-yon-sha*, are sold in a dried state, some of it is even twisted into a bast-rope. t would probably command a good price as a cordage or paper material, or for textile fabrics. When the object is to obtain material for the paper maker, it has been suggested to use the implement like a tilt hammer so much employed in India. See Musa.

(6402) PLASMA. A green, semi-transparent alcedony, having a dark tint, which is, supposed to be coloured by chlorite. It is found chiefly in India, and is made into beads, and other ornaments. Occasionally specimens are found mong the ruins of Rome.—*Waterston. Faulkner.*

(6403) PLATALEA, a genus of Birds belonging to the family *Ardeidæ*. The peculiar form of the bill in this genus has gained for these birds the common name of Spoonbill. It has the following generic characters:—Bill very long, strong, very much flattened, point dilated and rounded into the form of a spoon or spatula; upper mandible channelled, transversely furrowed at its base; nostrils at the surface of the bill, approximated, oblong, open, bordered by a membrane; face and head partially or entirely naked. Feet long, strong; three toes anteriorly united up to the second joint by membranes or webs; posterior toe touching the ground. Wings moderate, ample; the first quill nearly as long as the second which is the longest. The Spoonbills live in society in wooded marshes, generally not far from the mouths of rivers, and are rarely seen on the sea-shore. Their food consists of small fishes, spawn, and small fluviatile testaceous molluscs, as well as small reptiles and aquatic insects. According to circumstances they build their nests either in high trees, in bushes, or among rushes. Their moult is simple and ordinary, but the young bird does not take the confirmed livery of the adult till the third year; the bill is gradually developed, and appears covered with a membrane. The crest makes its appearance at the second year. The sexes have external distinctions, but the characters are but slightly marked. (Temminck.)—*Eng. Cyc.*

(6404) PLATALEA LEUCORODIA, Linn., the Common White Spoonbill. This species is, there can be little doubt, the λευκερωδίος of Aristotle ('Hist. Anim.,' book viii. c. 3), of which he says that it haunts περί τάς λίμνας καί τοὺς ποταμοὺς ("about the lake and rivers"); and which he ms. describes:—"In size it is less than the other," the Ἐρωθιός (one of the Herons, perhaps *Ardea cinerea*) "and has a broad and long bill;" description which, when coupled with the white colour indicated by the name, can hardly be deemed inapplicable; nor can the term 'broad' be with any propriety referred to the bill of any of the true Herons. It is the Becquarouglia (Belon) and Cucchiarone (Bonaparte) of the modern Italians; Pale, Poche, Cueiller, Truble (Belon), and Spatule of the French; Weisser Loffeler and Loffel Gans of the Germans; Lepelaar of the Netherlanders; Elydon Big of the Welsh; and Spoonbill and White Spoonbill of the English. This bird has a very full long occipital crest, formed of loose and subulate feathers. It feeds on very small fish, spawn, testaceous molluscs, insects and aquatic worms, small reptiles, and the roots of some weeds and grasses. The Common Spoonbill haunts the mouths of rivers. Its nest is built sometimes on lofty trees, sometimes in rushes and reeds, according to circumstances and the eggs are from two to four in number, generally three, sometimes entirely white, but most frequently white marked with obscure red spots. They bred annually in the time of Ray in a wood at Sevenhuys, not far from Leyden, but the wood has been long destroyed.—*Eng. Cyc.*

(6405) PLATANACEÆ: PLANES, a natural order of Exogenous Plants. The species are amentiferous trees or shrubs, with alternate deciduous palmate or toothed stipulate leaves, and unisexual naked flowers in globose catkins. The barren flowers with stamens single, mixed with scales. Fertile flowers with ovary 1-celled, style thick and subulate. Ovules 1-2, orthotropal; suspended. Nuts clavate, with a persistent style. Seeds usually solitary and albuminous; radicle inferior. They are natives of the Levant and North American chiefly. They are fine trees, but their timber is not durable.

(6406) PLATANUS ORIENTALIS, Oriental Plane, has palmate leaves resembling those of the common Sycamore. It grows in the western parts of Asia, and extends as far east as Cashmere. Its wood is fine-grained and hard, and when old it acquires dark veins so as to resemble walnut-wood. The tree was valued for its shade by the Greeks and Romans, and it was held sacred in the East. *P. occidentalis* is found in most parts of North America, from Mexico as far as Canada. The timber is of a reddish colour, and will not bear exposure to the weather. There is but this one genus in the order and six species. The family resembles *Artocarpaceæ* and *Altingiaceæ*.

(6407) PLATINA. A metal of a colour between steel-gray, and silver-white, which, in respect of scarcity, beauty, ductility, and indestructibility, is hardly inferior to gold. It is found in the metallic state in Brazil and Peru, in Antioquia in South America, in Estremadura, in Spain, and latterly, in considerable quantities in the Uralian Mountains. The general appearance of it in the rough state, is that of small grains or scales darker than silver, and extremely heavy. This metal is peculiarly valuable in many chemical applications, and is much employed for crucibles, retorts for the distillation of sulphuric acid, mirrors for reflecting telescopes, &c. In Russia it is made into coins.—*Faulkner.* Platinum, or Platina, is an important metal, although it was not known earlier than about the middle of the last century. It was first made known in Europe by Mr. Wood, assay-master in Jamaica, who met with its ore in 1741. In 1750 he published a paper upon it in the 'Philosphical Transactions.' The name of this metal is the diminutive of 'plata' silver, given to it on account of its colour, and it was originally called Platina del Pinto, because it was found in the auriferous sand of the river Pinto. It has since been found in Brazil, Colomba, St. Domingo, and in the Ural Mountains.—*Eng. Cyc.*

(6408) PLATYLOBIUM TRIANGULARE. LEGUMINOSÆ. These are free flowering shrubs, with pretty orange, yellow, or red-coloured flowers, and are readily grown from seed in any tolerable garden soil.—*Riddell.*

(6409) PLATYSTEMON CALIFORNICUM. RANUNCULACEÆ. These are annuals with cream coloured flowers, natives of California, and said to grow best in sandy loam.—*Riddell.*

(6410) PLECTOCOMIA. A genus of palms growing in Malacca, Java, Assam and the Cossya Hills, with leaves of great length, having a hook at the end by which to support themselves.—*Seeman.* Plectocomia is the *Rhenoul* of the Lepchas and is not a very large plant: but it climbs lofty trees and extends 40 yards through the forest, 6500 is the upper limit of the Palms in the Sikkim Himalayas, the *Rhenoul* alone attaining this height.—*Hooker Vol.* I, *p.* 147.

(6411) PLECTRANTHUS (from πλῆκτρον, a cock's spur, and ἄνθος, a flower, in reference to the corolla being spurred or gibbous above the base), a genus of Plants belonging to the natural order *Labiatæ.* It has a campanulate 5-toothed calyx in the floriferous state; the teeth equal or the upper one largest. The corolla with an exserted tube; the upper lip from 3-4-cleft, the lower one entire, usually longer and concave. There are 4 stamens, declinate, didynamous, the lower ones longest; free toothless filaments; ovate uniform anthers. The species are herbs, subshrubs, and shrubs. There are 45 species of this genus described, which are of easy culture and propagation.—*Eng. Cyc.*

(6412) PLECTRANTHUS AROMATICUS. FRAGRANT PLECTRANTHUS.

Pathur-choor. HIND.

Cultivated in gardens at Ajmeer.—*Genl. Med. Top. p.* 200.

(6413) PLECTRANTHUS CORDIFOLIUS, a very aromatic plant of India of the family LABIATÆ.—*O'Shaughnessy, page* 491.

(6414) PLECTRANTHUS CRASSIFOLIUS is esteemed in India both as a perfume and a spice, being equally valued in the toilet and the kitchen. The Patchouly, so inimical to vermin and so efficacious in preserving cloths from moths, was said to be the leaves of *P. graveolens,* which have a very powerful odour, but the comminuted state in which it is imported renders this uncertain.—*Eng. Cyc.*

(6415) PLECTRANTHUS RUGOSUS. Rottler.

Sirroo Kalung, TAM.

This seems peculiar to the Tinnevelly country; and has a wholesome pleasant tasted, bulbous root, much eaten by the Natives particularly during the period of their great festivals. Its leaf is rough and not unlike that of Burrage.—*Ainslie, p.* 250.

(6416) PLEURONECTES SOLEA. THE SOLE.

Naak meen, TAM.
Kowlie mutchie, DUK.
Ecan-leda MALAY.

Ains. Mat. Med. p. 155.

(6417) PLEUROPTRA, a tribe of *Mammalia* generally known as Flying Lemurs (*Galiopithecus* of Pallas; Flying Cats and Flying Foxes of voyagers). They are generally arranged under the order Carnassiers, and some authors place them in the division *Cheiroptera*; but they differ from the Bats inasmuch as the toes of their anterior extremities, which are all furnished with sharp claws, are not more elongated than those of the hind feet, so that the membrane which occupies the interval between the extremities to the sides of the tail can hardly operate in executing more than the functions of parachute. The dentition, according to Mr Waterhouse, is as follows:—

$$\text{Incisors, }\frac{2\cdot2}{4};\ \text{Canines, }\frac{0\cdot0}{1\cdot1};\ \text{False Molars, }\frac{2\cdot2}{2\cdot2}\ \text{True Molars, }\frac{4\cdot4}{4\cdot4}=\frac{34}{34}$$

Cuvier states that the *Galeopitheci* live on trees in the islands of the Indian Archipelago and there pursue insects, and perhaps birds, as their prey: judging from the detrition of the teeth with age, he thinks that they must also feed on fruits. They have a very large cæcum. In their teeth they present many analogies to the *Lemuridæ.* Dr. Gray makes the *Galeopithecidæ* the fourth family of the *Primates,* and places it between the *Lemuridæ* and *Vespertilionidæ.* ('Outline, &c., in Ann. of Philosophy, 1825.) Three species have been recorded:—1 *Galeopithecus rufus,* Geoff., Audeb. (*Lemur volans,* Linn.); 2, *G. variegatus,* Cuv., Geoff. 3, *G. Ternatensis,* Geoff.: but the general opinion seems to have been that one only, the (*Lemur volans* Linnaeus) had been satisfactorily made out. Mr. Waterhouse has however described two species, of which the following are the characters:—

(6418) *Galeopithecus Temminckii* measures about 2 feet in total length, and its skull was 2 inches 11½ lines in length. The anterior incisor of the upper jaw is broad, and divided by two notches into three distinct lobes; the next incisor on each side has its anterior and posterior margins notched; and the first molar (or the tooth which occupies the situation of the canine) has its posterior edge distinctly notched. This tooth is separated by a narrow space, anteriorly and posteriorly, from the second incisor in front and the second molar behind; the temporal ridges converge towards the occiput, near which however, he observed, they are separated usually by a space of about four lines. This is probably the *G. volans* of authors; but the identity cannot be said to be certain.

(6419) *Galeopithecus Philippinensis* is described by Mr. Waterhouse as being usually about 20 inches in length, and its skull as measuring 2 inches 7 lines in length. He observes that this species may be distinguished from *G. Temminckii* by the proportionately larger ears and the greater length of the hands. The skull is narrower in proportion to its length, the muzzle as broader and more obtuse, and the orbit as smaller. The temporal ridges generally meet near the occiput, or are separated by a very narrow space. The anterior incisor of the upper jaw is narrow, and has but one notch; the next incisor on each side is considerably larger, longer, and stronger than in *G. Temminckii*, and differs moreover in having its edges even—the same remark applies to the first false molar. In this species the incisors and molars form a continuous series, each tooth being in contact with that which precedes and that which is behind it. The most important difference perhaps which exists between the two species in question consists in the much larger size of the molar teeth, in the smaller skull, the five posterior molars occupying a space of 10 lines in length, whereas in *G. Temminckii*, a much larger animal, the same teeth only occupy 9 lines. ('Zool. Proc,' 1839.)

(6420) PLOCARIA; a genus of Plants belonging to the alliance *Algales*, the order *Ceramiaceæ*, and the sub-order *Sphærococceæ*. One of the species, *P. Helminthocorton*, is called Corsican Moss, and has a considerable reputation as a vermifuge. It is a native of the Mediterranean.—*Eng. Cyc.*

(6421) PLOCARIA CANDIDA. FUCUS AMYLACEUS.

Kyouk-pwen, BURM.

A sea weed, abundant on the Tenasserim coast, and exceedingly valuable for its nutritious and medicinal properties for invalids. It was first brought to public notice by Dr. O'Shaughnessy as the Edible moss of the Eastern Archipelago, and referred by him to the genus fucus. The fructifications however being in small tubercles, the Rev. Mr. Mason considers it as a species of Agardh's genus, Sphærococcus which now constitutes a member of the genus Plocaria. It is an allied species with the Ceylon moss (Gigartina lichenoides) first described as fucus amylaceus by Dr. O'Shaughnessy, the Plocaria lichenoides of Mr. Mason; also with a species found on the coast of Devonshire in England; Pl. compressa: with the Corsican moss of the Mediterranean P. Helminthochorton; also with the Agar-agar Pl. tenax a species used in China, as a substitute for glue and gum *Arabic*, but differs from the Irish moss, or Chondrus crispus; and is not of the same natural family as the Iceland moss which, indeed, is a lichen, the Certraria islandica. The Tenasserim moss is said to be superior to all others, as it is wholly free from the bitter principle which renders other fuci so objectionable; but Mr. Mason seems to consider it identical with the Ceylon moss, for he gives the same account of it as Dr. O'Shaughnessy gives of that from Ceylon. It contains he says a considerable proportion of starch, and was hence named by Dr. O'Shaughnessy, the starch fucus, F. Amilaceus but its specific name has been since changed to *candida*, white, probably from a mistaken idea that the substance is naturally white, whereas it becomes so only by bleaching in the sun; its natural tint, is a shade between olive and purple, such as the natives designate red. According to Dr. O'Shaughnessy's analysis it contains as follows:

Vegetable jelly,	54.5
True starch,	15.0
Wax, a trace	0.5 ?
Ligneous fibre,	18.0
Gum,	4.0
Sulphate and muriate of soda,	6.5
Sulphate and phosphate of lime,	1.0
Iron, a trace,	0.4 ?
	100.0

On the best mode of preparing it for use he adds: "In the first place, from the tendency of *pectin* or vegetable jelly to form insoluble compounds with saline and earthy bases, it is necessary to steep this fucus for a few hours in *cold rain water*, as the first step in its preparation. This removes a large portion, if not the entire, of the sulphate of soda, leaving all the gelatine, and starch. It should next be dried by the sun's rays, and *ground to a fine powder*; I say *ground*, for cutting or pounding, however diligently or minutely performed, still leaves the amylaceous globules so mechanically protected, and so closely involved in an external sheath of tough ligneous fibre, that scarcely a particle of the starch can be extracted by boiling, even though the decoction is prolonged for several hours. When *ground*, boiling for 25 minutes or half an hour dissolves all the starch and gelatine. The solution while hot should be passed through muslin or calico, and thus the ligneous fibre is removed : lastly, the strained fluid should be boiled down till a drop placed on a cold surface gelatinizes sufficiently. "With milk and sugar, and flavoured with lemon juice or sherry, this substance when prepared as now directed, would afford the invalid a pleasant article of diet, especially at sea, where other jellies or their materials cannot be so easily preserved. As this fucus is found abundantly on the eastern coast of Bengal, he entertained considerable hopes of its being hereafter found available also in several processes of art and various manufactures."—*Mason.*

(6422) PLOCEINÆ, a sub-family of *Fringillidæ.* The genus *Ploceus* (Weavers, Tisserins of the French) is thus defined by Mr. Swainson :—Size small. Bill conic, but with the culmen slightly bent, and the tip entire. Under mandible less thick than the upper. Claws large, very long. Wings pointed; but the first quill remarkably short and spurious. It inhabits the Old World only.—*Eng. Cyc.* Next to the sub-genus *Vidua*, in Mr. Swainson's arrangement, come the following :—

(6423) *Euplectes* (Sw.)—Bill shorter than the head. Nostrils round, partly concealed by the frontal feathers. Wings short; the second quill shorter than the third; tertials as long as the primaries. Tail short, even, or very slightly rounded. Feet large, gracile. Toes very long and slender; the lateral of equal length. Claws slender, very slightly curved.

(6424) *Ploceus* (Cuv.).—Bill considerably lengthened, as long as the head. Nostrils almost naked. Wings moderate; the second, third, fourth, and fifth quills nearly equal; tertials shorter than the primaries. Tail short, even. Feet large, thick. Toes robust; the lateral equal. Claws strong, thick, fully curved.

(6425) *Symplectes* (Sw.).—General structure of *Ploceus*; but the bill is more compressed, the commissure curved, but neither sinuated nor toothed. Wings short, rounded; the first quill half as long as the second; which, with the third, is graduated; the next three are nearly equal, and are the longest. Tail moderate, even. Feet strong. The middle toe abbreviated; inner toe shorter than the outer; hinder toe long, equal to the middle toe.

(6426) *Amadina* follows in Mr. Swainson's arrangement, and he speaks of the genus *Ploceus* thus defined as by far the most beautiful of the division of *Coccothraustinæ.* "It is," says he, "composed of the Weavers, a name given them on account of that surprising skill with which they fabricate heir nests."

(6427) PLOMBAGO, CARBURET OF IRON. Black Lead, Plumbago. Is said to be occasionally sold for antimony in the bazars, it is found in Ceylon and in Travancore, also in the Northern Circar mountains in the Vizagapatam districts, though I am not aware of any having found its way into the market, but I understand it has been procured thence by the proprietors of the Bimlipatam sugar works for use in machinery. I have had some of good quality for common purposes, found in the hill on which Capt. Orr's house stands.—*Rohde, M.S.S.* Plumbago abounds in the hills skirting the Western boundary of the Vizagapatam district. The deposits have never been worked, and that which is brought to the Coast is coarse and impure.—*M. C. C.* Of samples of plumbago from several localities, the finest and most varied series both as regards size and quality were those exhibited by General Cullen from Trevandrum. One large block occurs along with laterite and contains some pieces the size of a walnut, nearly equal to the fine kinds of Cumberland black lead. Other large blocks nearly a foot in cubic measurement appear of a softer and coarser quality. They have been sawed through, but are not so compact as the brightest portions of the first named block. This plumbago or graphite is well suited for the manufacture of ordinary pencils or for making crucibles. Mr. Caldecot exhibited some very fair samples from the same locality; the Zemindar of Vizianagrum also exhibited some fair specimens. Lieut. Evans, 51st Regiment M. N. I., exhibited plumbago of good quality from Ceylon, and of indifferent quality from beds of shale that accompany iron ore at Malacca. Some indifferent specimens of plumbago were also exhibited along with iron ore and slaty shales from Cuddapah.—*M. E. J. R.* Lately there have been made further observations on the Graphite or Plumbago of Kumaon and Travancore by Dr. Forbes Royle M. D. with an Extract from a letter from the Resident of Travancore and Cochin dated 9th Fubruary 1857. This Mineral was formerly found in its most pure state in Borrowdale in Cumberland, which indeed was the only Mine which produced Lead of that fine quality requisite for the manufacture of Drawing Pencils. The Cumberland Mines have been wrought since Elizabeth's time; pure Cumberland lead costing as much as from 30 to 40 shillings a pound. The lead is not found in veins but in detached pieces, so that the supply is occasionally irregular and the search for it laborious and often fruitless. Inferior descriptions of lead come from Spain and Ceylon, and are used in the manufacture of crucibles and of the inferior sort of Pencils and in polishing Cast Iron. At present Mr. Royle says, finely powdered Graphite can, by an extreme degree of pressure, be rendered nearly as compact as the best natural Graphite, or we should be without any more good drawing Pencils. The great Manufacturers of Pencils in England reported the Kumaon and Travancore specimens as quite useless for the manufacture of black lead pencils, observing that they could not use the specimens in the state in which they had been sent without damaging their machinery, at the same time they could not conceive why purer specimens should not be found in the same locality. In regard to the objections made to the specimens forwarded, General Cullen, the Resident of Travancore, remarks that one motive of their selection was to exhibit the matrix or Laterite rock in which they were found. General Cullen has addressed a further report on the Plumbago or Graphite of Travancore. Two varieties of Graphite are found in Travancore, one in thin laminæ, another granular, and he sent specimens of both to the Exhibition of 1851. The granular or fibrous variety, "I have only yet discovered in two localities and both of them in laterite, a few feet only below the surface. One locality is about 5 or 6 miles N. E. of Trevandrum and the other about 12 or 14 miles N. E. I brought in from this latter locality on my visit to it, about 3 cwt. Some small deposits are also found immediately on the W. of the town of Trevandrum, but I have not yet heard of any other deposits of this granular variety though I think it probable they exist. Graphite in thin scales or laminæ is common nearly throughout the laterite tracts of Travancore and Cochin, but more or less abundant in particular places. It is found in some places in lamina of considerable size, particularly in a laterite hill about 25 miles N. E. of Trevandrum at a place called Caviattencoodul, near the foot of the Ghât mountains. Having some specimens of this variety by me, I forward them. It is also found in laminæ of good size in the disintegrated gneiss of the Ghâts on the Tinnevelly side, also common in the Kunker or Travertine deposits near Culdacoorche and Ambasamooodrom. The Vizagapatam Graphite is perhaps also found in laterite, of which there is a large deposit at Bimlipatam. The objections made to the specimens of Graphite sent to the London Exhibition of 1851, were because of the impurities attached to it, but one motive in the selection of the specimens forwarded was to exhibit the matrix or laterite rock in which they were found. M. L S. Journal.—*General Cullen.*

(6428) PLOUGHING. The Chinese annual ceremony of ploughing is of very ancient origin. At Peking, it consists in ploughing a sacred field with a highly ornamental plough kept for the purpose, the Emperor holding it while turning over three furrows, the princes five, and the high ministers nine. These furrows were, however, so short that the monarchs of the present dynasty altered the ancient rule, ploughing four furrows and returning again over the ground. The ceremony finished, the emperor and his ministers repair to the terrace, and remain till the whole field has been ploughed. The ground belongs to the temples of Heaven and Earth, on the south of the city, and the crop of wheat is used in idolatrous services. The rank of the actors renders the ceremony more imposing at Peking, and the people of the capital make more of it than they do in the provinces. A monstrous clay image of a cow is carried to the spot, containing or accompanied by hundreds of little similar images; after the field is ploughed it is broken up, and the pieces and small images are carried off by the crowd to scatter the powder on their own fields, in the hope of thereby insuring a good crop. The heads of the provincial governments, the prefects and district magistrates, go through a similar ceremony on the same day. In Ningpo, an eye-witness describes the principal features of the ceremony as consisting in a solemn worship by all the local officers of a clay image of a buffalo and an idol of a cowherd. The prefect then ploughed a small piece of ground, and he and his associates dispersed till the morrow, when they came together in another temple at dawn. Here a series of prostrations and recitals of prayers were performed by the "fathers of the people" in their presence, some of whom seemed to have no respect for the worship they were engaged in, while others evinced deep reverence. As soon as this was over, the clay ox was brought out, and a procession consisting of all the officers passed around it repeatedly, striking the body at a given signal, and concluding the ceremony by a heavy blow on the head. The crowd then rushed in and tore the effigy to pieces, each one carrying off a portion to strew on his fields.—*Williams' Middle Kingdom, Vol.* II. *page* 109.

(6429) PLUMBAGO. *Plumbaginaceæ.*—The Lead Wort. (White) P. Zeylanica (Red) P. Rosea (Blue) P. Capensis.—The White Plumbago is common; so are the other varieties. The red and blue blossom throughout the year; but the latter, which is the handsomest of the whole, and introduced from the Cape, is by far the most esteemed. Is propagated by layers.—*Riddell.* These three different species of plumbago, the red, the white, and the blue flowered, are common in Tenasserim gardens; and the first two are cultivated by the Burmese for the vesicatory power of their roots.—*Mason.*

(6430) PLUMBAGO ZEYLANICA (Flower white.)

(6431) PLUMBAGO CAPENSIS (Flower blue.)

(6432) PLUMBAGO EUROPÆA, South of Europe.

Chitra vani, Sans.

An erect, branching, smooth, herbaceous shrub. The whole plant, especially the root, is very acrid, and applied as paste to the skin, acts as a powerful vesicatory. Given internally in small doses, it is said to be a very efficacious emetic, but we would deem its administration as dangerous as that of cantharides. The bruised root has been employed in Europe as an application to cancer, as a counter-irritant in toothache, and as a remedy for the itch.—*O'Shaughnessy, page* 508.

(6433) PLUMBAGO ROSEA. Lin.

Lal chitra, DUK.
Cditraca, SANS.
Chittra molum and kodivaylie, and Shencodie-vaylee, TAM.
Chitturmol, DUK.
Chita, HIND.
Chitra, BENG.
Shiturridge, ARAB.
Tumbe codiveli, HORT. MAL.
Yerra Chittramoolum, T.
Aroona Chitraca, SANS.

A native of various parts of the East Indies, an erect, herbaceous plant with a round striated stem, and ascending or erect branches. This like the Chittramoolum is a plant of the class Pentandria and order Monogynia and is nearly similar to it in its natural qualities. The bruised root tempered with a portion of same bland oil, is used as an external application in Rheumatic and Paralytic affections. It is also prescribed internally in powder, in small doses, for the same complaints.—*Ains. Mat. Med. p.* 112. The properties of this species and of the *P. scandens* and *zeylanica* are nearly identical. A paste made with rice congie and the bruised bark is applied by the natives to buboes in the incipient states : it acts as a vesicatory. Dr. O'Shaughnessy made numerous clinical experiments with the bark of the plumbago root of various species, especially the *P. rosea*, rubbed into a paste with water and a little flour, or congie ; it occasions pain in about five minutes, which increases in severity till in a quarter of an hour it is equal to that of a cantharides blister or mustard sinapism. If the paste be removed in half an hour the pain is soon allayed, and in a period of 11 to 18 hours a large uniform blister, full of serum, is occasioned. The blistered surface heals readily without unpleasant ulceration. Applying Plumbago Rosea in the native, the skin in a few minutes is intensely blackened ; in white-skinned persons a deep redness is occasioned. In all chronic cases and in many acute diseases this blister will prove an effectual and very cheap substitute for cantharides, over which it possesses the peculiar advantage of never producing strangury or any other form of irritation of the urinary organs. Dr. O'Shaughnessy speaks from the experience of from 3 to 400 cases. His experiments lead him to believe that the blistering quality resides in the Plumbagin, but on this he was as yet unable to speak in positive terms. The root, in various forms, is much employed as a poison in India ; and as an irritant to occasion abortion it is introduced into the vagina and applied directly to the neck of the uterus. In a criminal case of the former kind, in 1837, Dr. O'Shaughnessy, succeeded in detecting the poison by acting on the contents of the stomach with alcohol, concentrating the tincture, re-dissolving in a small quantity of boiling water, and adding the sub-acetate of lead, by which the very characteristic red colour was immediately occasioned. By a modification of this process two grains of the powdered bark may be detected in a pint of a mixture of milk, blood, and various articles of food.—*O'Shaughnessy, page* 509—10.

(6434) PLUMIERIA. Several species of this genus, natives of Jamaica, Surinam, Brazil, the Malayan Archipelago, and Cochin China, are used as drastic cathartics.—*O'Shaughnessy.*

(6435) PLUMIERIA ACUMINATA. APOCYNACEÆ.

Gobur-Chumpa DUK.

A small elegant tree, common ; flowers white and yellow, tinged with red, very fragrant. A pure white caoutchouc is obtained from this tree.—*Riddell.* It is abundant and luxuriant in the Pinjore valley. (*Royle*)—*O'Shaughnessy, p.* 449. China champac. This, a small South America tree, is called by the Burmese, china champac, Its straggling, and often leafless branches shoot out from their extremities delicate orange-colored blossoms, tinged with red, and of sweetest fragrance.—*Mason.*

(6436) PLUMIERIA ALBA.

Gulachin, DUK.

The White Chumpa.

(6437) PLUMS. The well-known fruit of a tree (*Prunus domestica*), indigenous to the greater part of the Northern Hemisphere. No less than 274 varieties of this fruit are enumerated. Dried plums form an article of commerce under the names of prunes and prunellas.—*Faulkner.*

(6438) POA (the Greek πόα 'grass'), a genus of Grasses belonging to the tribe *Festucineæ.* This tribe is characterised by very short styles, protruded stigmas, and the glumes shorter than the lowest flower. The genus *Poa* has its glumes rather unequal ; the outer palea with 3 or 5 nerves, membranous below, scarious at the tip, compressed, keeled, unarmed ; the styles terminal. The species of this genus are very numerous, constituting the commonest weed that follow the migrations of man, and generally containing a sufficient quantity of nutritive matter to render them fodder for various animals. Thirteen species of this genus are described by Babington as natives of the British Islands. Of these the most common are the *P. annua* and *P. pratensis.* The former is perhaps the commonest of British plants, springing up on every neglected spot around the habitations of man. The latter is known by the name of the Smooth-Stalked Meadow-Grass, and is found in most pasture lands. *P. nemoralis,* the Wood Meadow-Grass, is also a common grass in shady places. Many of the recent genera of Grasses were formerly referred to the genus *Poa.*—*Eng. Cyc.*

The sacred grass of the Hindoos, the *dab* or *koosha* of the Brahmins (*Poa cynosuroides*), is made into rope in North-West India. Species of Saccharum are used for thatching and for screens, and some for making writing-pens and for The fibres of the *Khuskhus* or Vetiveyr are more remarkable for their agreeable odour than for their tenacity, while the Bamboo, the most gigantic of grasses, might be enumerated with timbers rather than with fibres, though its split stems are often employed for making mats in India, and the young shoots for paper-making by the Chinese. Many other of the grasses might be converted into half-stuff for paper-makers, and have the great advantage of affording large quantities of a cheap material.—*Royle.*

(6439) PODA WOOD.

Poda, TEL. | Pallas, HIND.

(6440) PODALYRIA GENISTOIDES. LEGUMINOSÆ. These are pretty shrubs with silky leaves, and should be grown in a light garden soil, their colours are mostly white, purple, blue or red, and should be raised from seed.—*Riddell.*

(6441) PODOLEPIS GRACILIS. COMPOSITÆ. The stems of these plants are covered with scales, the flowers are white, yellow and pink; these plants are adapted for borders, and may be raised from seed.—*Riddell.*

(6442) PODOPHYLLUM PETLATUM, (may-apple) is a native of the United States, where the root is considered to be a valuable, and powerful cathartic.—*O'Shaughnessy, page* 170.

(6443) PODOPHYLLUM EMODI, Wall. Occurs in Nipal and Kemaon, and on the Choor mountain in the Himalayas, at an elevation of 10,000 feet. A specimen of the root was forwarded to the Committee investigating the Bengal drugs, by Dr. Falconer, of Seharunpore, but the quantity obtained was too small for the requisite experiments being instituted upon its virtues.—*O'Shaughnessy, page* 170.

(6444) PODOPHYLLUM HEXANDRUM, was found by Dr. Royle on the Kedarkanta mountain, at an elevation of 12,000 feet.—*O'Shaughnessy, page* 170.

(6445) PODOSTEMON. Of this genus of plants, Dr. Wight in Icones gives, P. dichotomus, 1916-2; elongatus, 1917-1; griseus, 1918-3; olivaceus, 1918-2; rigidus, 1916-5; subulatus, 1918-1; Wallichii, 1916-1; Wightii, 1916-3.

(6446) PODOSTEMON. One species grew near the Jyntea Hills on the stones at the bottom of the Oongkot: it is a remarkable water-plant resembling a liver-wort in its mode of growth. Several species occur at different elevations in the Khasia, and appear only in autumn, when they often carpet the bottom of the streams with green. In spring and summer no traces of them are seen; and it is difficult to conceive what becomes of the seeds in the interval, and how these, which are well known, and have no apparent provision for the purpose, attach themselves to the smooth rocks at the bottom of the torrents. All the kinds flower and ripen their seeds under water, the stamens and pistil being protected by the closed flower from the wet. This genus does not inhabit the Sikkim rivers, probably owing to the great changes of temperature to which these are subject.—*Hooker Him.: Jour: Vol.* II. *page* 314.

(6447) PODOTHECA CAPITATA. A yellow flowering plant of no great beauty—readily cultivated from seed.—*Riddell.*

(6448) POEE, BASELLA ALBA ET RUBRA. Malabar Nightshade. This is a twining, succulent plant, with smooth fleshy leaves; it grows very rapidly and is generally cultivated as a spinach. There are two sorts.—*Jaffrey.*

(6449) POGOSTOMON. A genus of plants, one of which, P. Pachouli, furnishes the fragrant herb of that name, Dr. Wight gives in Icones, Pogostemon Heyneanus, 1440; hirsutus, 1442; rotundanus, 1441; speciosus, 1443. See PATCHOULI.

(6450) POINCIANA, a genus of Plants belonging to the natural order *Leguminosæ*. *P. aculeata*, or the Barbadoes Flower-Fence, is a tropical bush, about ten feet high, with bipinnate leaves, obovate leaflets, prickly branches, large terminal corymbose masses of inflorescence, covered with showy yellow or red flowers, having singularly long stamens. It has acquired its name from having been used, on account of its prickly branches, as a material for hedges in the West Indies, for which however it is ill adapted, because its branches are not much subdivided, and are always naked next the root. It is among the most beautiful of plants, and is chiefly on that account cultivated in the West Indies, to which it was introduced from the East Indies, where it is common in gardens, flowering and seeding all the year round. The leaves when bruised have a smell of savin, and are said to have the power of bringing on abortion. They are well known to be purgative, and to have been used as a substitute for senna. According to Roxburgh, the trunk of this little tree, or large shrub, when old, is constantly hollow, and occupied by a large red dark brown ant. From this place, when disturbed, the ants issue in swarms, and inflict a severe and painful bite on their disturbers.—*Eng. Cyc.*

(6451) PONICIANA ELATA. WILLOW.

Sooneaishla, TEL. | Neerangi, CAN.
Pade Narrayan, TAM.

This Willow has been extensively and successfully used by Major Lawford, Madras Engineers, as a protection for the footings of rivers and channel banks. Where it is not wanted to spread laterally and to cause obstructions, it should be planted in cuttings in December; it grows quickly; its wood might be used for basket boats. The tree affords a grateful shade, and though continually stripped of its leaves, which are extensively used for manuring indigo fields in Cuddapah, it quickly replaces them and that abundantly.—*Dr. Cleghorn.* Poinciana Gilliesii. Most of these plants are Natives of India; one well known as the Goolmohur flowers, grown from seed. P. Gilliesii is from Mexico.—*Riddell.*

(6452) POINCIANA PULCHERRIMA.

Krishna choora, Beng.	Gul-i-turah, Hind.

Is said to be much used in medicine in upper India, but for what purpose, is not stated. Ainslie notices the plant under the name of *Kurrish-churrin.* A decoction of the leaves and flowers is given as a febrifuge in Tortola; the leaves are purgative, and when bruised smell like sabine; in infusion they are considered powerfully *emmenagogue.* These properties demand careful investigation.—*O'Shaughnessy, p.* 317. This gaudy ever-flowering shrub is planted in Barbadoes for hedges; it is much cultivated by the Burmese, and the variety with yellow blossoms is occasionally seen in their gardens. It is sometimes called peacock's pride, and Spanish carnation.—*Mason.* It is commonly cultivated at Ajmeer; it is a splendid shrub during the rains and very hardy.—*Genl. Med. Top. p.* 192. This beautiful plant, grows to the height of five or six feet, the leaves during the rains are green, and afterwards become of a bright scarlet having a most showy appearance, easily propagated by cuttings, both leaves and bark contain a milky juice which when dried and boiled possesses some of the properties of gutta percha.—*Riddell.* This plant has been recently introduced into the gardens in Maulmain; and its large vermillion-colored floral leaves render it, when in flower, a very ornamental plant.—*Mason.*

(6453) POINCIANA REGIA. A large tree with showy coloured flowers. Introduced from Madagascar, and still confined to gardens. The wood seems good. Hort. Garden 21.—*M.E.J.R.* This gorgeous shrub which has been introduced from Madagascar into India, bears a most magnificent and graceful flower; and as it flourishes well in the Tenasserim Provinces, if it were generally planted in gardens, it would add much to their beauty.—*Mason.*

(6454) POIVREA COCCINEA. *Syn.* COMBRETUM PURPUREUM. This at present is the popular favorite amongst climbing plants in Madras; requires a trellis not too high, the sooner it gets a procumbent position the more luxuriant it will grow and flower, unfit for pot cultivation, easily propagated by cuttings of the young wood in sand under glass. Native of Madagascar.—*Jaffrey.*

(6455) POIVREA GRANDIFLORA. *Syn.* COMBRETUM GRANDIFLORUM. Similar to the above in habit but having far superior flowers. Native of S. Leone.—*Jaffrey.*

(6556) POIVREA ROXBURGHII. Among the fibrous barks sent from Assam to the Exhibition of 1851, was one that was named Roxburghia in the Catalogues. This is no doubt a mistake for some plant called after Dr. Roxburgh, probably *Poivrea Roxburghii,* one of the *Combretaceæ,* of which several are remarkable for tough wood as well as bark.—*Royle Fib. Pl. p.* 301.

(6457) POLANISIA (from πολ many, and ἄνισος unequal; stamens numerous and unequal), a genus of Plants belonging to the natural order *Capparidaceæ.* It has 4 spreading sepals; 4 petals; a small torus; silique sessile within the calyx, or hardly stipitate, terminated by a distinct style.—*Eng. Cyc.* Dr. Wight gives, Polaisir Burtporensis, 1,072; chelidonii, 310; and icosandra, 7. The genera Cleome and Polanisia, embrace several species of supposed medicinal virtues. Ainslie describes five species. The *Cleome felina* (cat's cleome, *Eng.* Swarnakshira, *Sans.*) is used as an astringent in northern India and Ceylon. The *C. pentaphylla,* (*Vern.* Hurhuriya, *Beng.* Caraila, *Hind.* Hoolhool; *Duck.* Caravela and Varsar, *Sans*) affords small, black, rather aromatic seeds, used by the natives in decoction as a stimulant drink in low fevers, and in some forms of convultion. The expressed juice too is considered stimulant, and sudorific. The *C. viscosa,* or viscid Cleome (*Vern.* Hoorhooria, *Hind.* Savana barbara *Sans.*) is also celebrated for its seeds, the *Chorie-ajooain,* of the bazars. These are believed to be vermifuge and stumulant, and are given to the extent of a tea spoonful twice daily (Ainslie.) The C. *dodecandria* and *icosandria* of Ainslie are identical with this plant, and are described by Lindley as *Polanisia icosandra.* In Cochin China the whole plant bruised is used like sinapisms for counter-irritation, and blistering. This fact deserves attentive experimental investigation.—*O'Shaughnessy, p.* 206.

(6458) POLANISIA ICOSANDRA, has stem covered with viscid glandular hairs, 3-5 foliolate leaves, the leaflets obovate, cuneate, o oblong pubescent, scarcely longer than the petiole; the stamens are about 10 in number; th silique terete striated, rough with glandular horns sessile and acuminated. It is a native of th East Indies, and is used in Cochin China as counter-irritant in the same way as sinapisms i Europe, and as a vesicant. The root is used a a vermifuge in the United States of America.—*Eng. Cyc.* The leaves of this very common wee when bruised, are said to act as a sinapism.—*Mason.*

(6459) POLISHING SLATE, *Polier Schiefer*, Mineral, occurring massive, with a slaty texure. Its colour is white, yellowish-white, or ellow. Brittle. Opaque. Specific gravity 0·59. t is found near Bilin in Bohemia, at Zwickau i Saxony, and Auvergne, and is supposed to e a volcanic product. Its analysis by Bucholz ives,

Silica	83·5
Alumina	4·0
Lime	8·5
Oxide of Iron	1·6
Water	9·0
	106 6

Eng. Cyc.

(6460) POLKEE, WOODS KNOWN BY THIS AME, VIZ.

White Polkee.

Tella polkee, TEL.	Suffaid polkee, HIN.

Black Polkee.

Nulla polkee, TEL.	Siah polkee, HIN.

Red Polkee.

Yerra polkee, TEL.	Taghanee kee lakree, HIN.

. C. C.

(6461) POLYANTHUS, a garden variety of e Oxlip Primrose, with brown flowers, is one those plants which have, from time immemoil, been favourites in gardens. It was probay obtained by accident, and is now propagated her by seeds or division of its root.—*Eng. Cyc.*

(6462) POLYANTHUS TUBEROSA, grows Lahore and on the hills. The natives say its eds are the white Todree of the oriental bazars ich, as also the other Todrees, Europeans pposed to be from Malacca. Whatever they y be they are effective medicine.—*Dr. Honigger, p.* 329. This, "the tuberose with her very light," a plant of the lily tribe, which has en introduced into India from Mexico or South erica, is cultivated very extensively by the rmans and in many English gardens. The wer has a delightful fragrance, and throws its odours strongest at evening.—*Mason.*

(6463) POLYGALA SENEGA, SNAKE ROOT. *roots.* Several species of Polygala are medially employed in Germany, South America, l Java. In Nipal and the Himalayas, the P. talarioides is used as a snake antidote. Of s species the stem is branched from the base, fruticose, decumbent, downy; leaves obovate, dge-shaped at the base, stalked; racemes 8—flowered, wings roundish, obovate, as long as orbicular, ciliated capsule. In the Moluccas *Soulamea amara* (Rex amarois) is stated to employed with great advantage in cholera, l in ague. All parts, especially the roots and it, are excessively bitter.—*O'Shaughnessy, es* 209-12.

(6464) POLYGALA SPECIOSA.—All the species of this genus are very handsome, showy flowers, they are natives of the Cape, some parts of Europe and America; their colours are chiefly pink, scarlet, red or white, they are readily grown from seed, and should be raised in a light soil.—*Riddell.*

(6465) POLYGONACEÆ, *Buckwheats*, a natural order of Apetalous Plants, with triangular fruit and usually with stipules united into a tube or ocrea, through which the stem passes. Their fruit is composed of three aspermous carpellary leaves joined by their edges, and surrounding a single erect ovule deriving its origin from a central placenta; and it proves the truth of the modern theory, that in many cases the ovules derive their origin immediately from the centre of vegetation, or the growing point, and not from the margin of carpellary leaves. The order consists of herbaceous plants more frequently than of shrubs, and a large part of them are mere weeds; as, for example, our docks, and wild polygonums; some however are handsome flowers, as the *P. orientale*, or Garden Persicaria, and *P. amplexicaule*; others are valuable for cooking, as the rhubarb, whose roots also furnish the important tonic and purgative drug of that name; and in some a great quantity of astringent matter is found, as in the *Coccoloba uvifera*, or Seaside Grape of Jamaica, from which a kind of Kino has been prepared. [COCCOLOBA]. A species of Indian *Polygonum*, *P. tinctorium*, has recently been introduced into cultivation in Belgium as a substitute for indigo. The flour of the seeds of *P. Tartaricum*, *P. Fagopyrum*, and others, is made into a bad kind of bread in Lombardy and other countries. The genus *Rheum* also belongs to this order.

(6466) POLYGONUM (the Greek πολύγονον, 'much productive'), a genus of Plants belonging to the natural order *Polygonaceæ*. It has a 5-parted perianth, from five to eight stamens, and from two to three styles; a 1-seeded trigonous or compressed nut, lateral incurved embryo, the cotyledons not contorted. This is a very extensive genus, containing the Knotgrasses, Bistorts, Persicarias, and Buckwheats of English waysides, fields, and gardens. They grow in almost any soil, some being aquatic, and others flourishing in sandy sterile tracts.—*Eng. Cyc.* Roxburgh in his second volume, p. 285 et seq., (Octandria trigynia) names 15 species of Polygonum, but no information as to their properties. His *P. lanatum*, common round Calcutta, is called *Sweet panee merich*, or white water pepper; *P pilosum*; *burra panee merich*, or great water pepper, is also common near Calcutta, and flowers at the beginning of the wet season. The name denotes its analogy in properties to the P. Hyderopiper of Europe, which gives a yellow colour to wool; *P. flaccidum* is also called *Panee merich* in Calcutta.—*O'Shaughnessy, page* 523.

In China, two species of Polygonum are cultivated for the blue dye furnished by the leaves, which is extracted like indigo by maceration.—*Williams' Middle Kingdom, page* 282. In Icones. Dr. Wight gives Polygonum ambiguum 1797; *aviculare*, 1808; barbatum, 1798; Chinense, 1806; Donii, 1801; glabrum, 1799; horridum, 1803; Indicum, 1808; molle, 1807; Nepalense 1804; pedunculare, 1802; strictum, 1800; Wallichii, 1805.

(6467) POLYGONUM AMPHIBIUM. The Root-like stems of this polygonum, resemble sarsaparilla, as a substitute for which it has been used with alleged success.—*O'Shaughnessy, page* 523. Vegetates in Cashmere, and is considered as a veterinary medicine; whence its name, guree (horse).—*Honigberger, p.* 330.

(6468) POLYGONUM AVICULARE, KNOT GRASS.

Nisomali, SANS. Machooti, HIND.

Considered medicinal in Behar. Fruit said to be emetic and cathartic.—*O'Shaughnessy, page* 522. Polygonum Aviculare has from one to three flowers together, axillary lanceolate leaves, or elliptical. Plane stalked lanceolate acute ocreæ, with few distant simple nerves at length by growth becoming torn, a triquetrous nut with raised points shorter than the perianth. Its numerous seeds supply abundant food for small birds; they are said to be emetic and cathartic. Thunberg says that in Japan a blue dye is prepared from this plant.—*Eng. Cyc.* Polygonum aviculare—grows at Cashmere, and is there officinal. Its fruit is said to be emetic and cathartic (Beng. Disp.)—*Honigberger, page* 330.

(6469) POLYGONUM BARBATUM, China and East Indies.

Aatalari, TAM.	Kuuda mallier, TEL.

Considered diuretic at the Cape of Good Hope and given in infusion by the native doctors in India in cases of colic.—*O'Sh. p.* 522.

(6470) POLYGONUM CYMOSUM. Wall. A wild buckwheat is abundant, at Choongtam in Sikkim which formed an excellent spinach: it is called "Pullopbi;" a name I shall hereafter have occasion to mention with gratitude. This is a common Himalayan plant, and is also found in the Khasia mountains.—*Hooker Him. Jour. Vol.* II. *page* 31.

(6471) POLYGONUM LINIFOLIUM as also Poligonum aviculare and affinis species; grows about Lahore, where it is well known, but little used.—*By Dr. Honigberger, p.* 330.

(6472) POLYGONUM MACROPHYLLUM. grows among the Cashmerean mountains, where its roots are officinal.—*Dr. Honigberger, p.* 330.

(6473) POLYGONUM MOLLE, grows on the Cashmerean mountains and its roots are officinal at Cashmere.—*Dr. Honigberger, p.* 330.

(6474) POLYGONUM PERSICARIA. This is a very extensive genus of plants; the dwarf persicaria, a garden plant, is of easy culture, also the red and white: the P. Hydropiper, a water plant, has beautiful pink flowers.—*Riddell.*

(6475) POLYGONUM TINCTORIUM, *chinense*, and *barbatum*, yield a blue dye like indigo, in China and Japan.—*O'Shaughnessy, page* 523. See DYES.

(6476) POLYNEMUS, a genus of Fishes placed by Cuvier in his third division of th *Percidæ*, the species of which are distinguishe by the ventral fins being inserted farther bac than the pectorals. These fishes are furthe distinguished by having several long filament beneath the pectoral fin; these are, in fact, fre rays of that fin; their teeth are minute and dens as the pile on velvet, or recurved like the teet in a carding-machine; they are found on bot jaws, as well as on the vomer and palate. Th general form of the body of the *Polynemi* some what resembles that of the perch; the muzzl projects over the mouth; the eyes are rathe large and placed very forward; the dorsal fin are short and widely separated, and the caud fin is large, and more or less forked. The scale extend on the fins, as in many of the *Sciænid* which these fishes appear to approach in som other characters. Considerable interest is a tached to the *Polynemi* on account of their yiel ing isinglass. This fact was first made know by Dr. Cantor, who found that several species *Polynemus* might be used for obtaining isinglas "The species best known," says Dr. Cantor, a communication to the Zoological Society, " the *Polynemus Risua* of Hamilton (*P. longifil* Cuvier; the Tupsee, or Mango fish, of the A glo-Indians); this inhabits the Bay of Beng and the æstuaries of the Ganges, but enters t mouths of the rivers even higher up than C cutta during the breeding season (April a May), when the fish is considered in its high perfection, and is generally sought as a gr delicacy. This species is the smallest, for length seldom exceeds eight or nine inches, a one inch and a half or two inches in depth." is remarkable for the great length of filamen or free rays, of the pectoral fins, these bei about twice the length of the body, and seven number on each side. *P. aureus* and *P. Top* of Hamilton, Dr. Cantor states, are closely all to this species. "*Polynemus Sele*, Hamilton *plebeius*, Broussonnais; *P. lineatus*, Lacepe is the Suleah Fish first mentioned in Parbu 'Oriental Herald,' as yielding isinglass. T species, as well as another closely allied to *quadrifilis*, Cuvier, which was dissected, fig ed, and described, under the name of *P. Salt* (Saccolih), appears to be equally plentiful, shoals, all the year round, in the æstuaries of the Ganges, and is appreciated by Europeans for its excellent flavour: both species attain a size from three to four feet in length, and eight to ten inches in depth." (Cantor.) Besides the species found on the coast of the mainland, two other species of *Polynemus*, *P. hexanemus* and *P. heptodactylus*, have been dis-covered off the coast of Java. On the coast of Africa and in the West Indies, certain species of he present genus are found. One of the African pecies is confounded by Cuvier with the Indian P. *longifilis*, and the mistake has been rectified y Mr. Bennett. It appears that this species which is in all probability the *Pentanemus* of Artedion, which Linnæus established his *P. quin-uarius*) differs from the Mango Fish of India the number of free rays to the pectoral fins, he latter having seven rays, and the African pecies only five. Messrs. Cuvier and Valen-iennes, not having found any species of *Polyne-us* with so few as five free rays, and those onger than the body, imagine that the *P. quin-uarius* was founded on a muilated specimen. everal individuals however having this charac-er being discovered by Captain Belcher, R. N. uring his survey of a part of the Atlantic coast North Africa, Mr. Bennett proposed to name e species after Artedi. The second African ecies belongs to that section in which the free ys of the pectoral fins are short, and has re-ived the name of *Polynemus quadrifilis*. In e American *Polynemus* (*P. Americanus*) there e seven free rays to the pectoral fin, and these arcely reach the tip of the ventral fins: it is out one foot in length, of a silvery colour; e pectoral fins are almost black, and the other s are spotted with black.—*Eng. Cyc.*

(6477) POLYNEMUS INDICUS. Robal sh.

Cala meen. Tam.

(6478) POLYODONTA ('many-toothed' be), a name applied by Lamarck and M. De ainville to the *Arcacea* [Arcadæ] of the mer, the Ark-Shells, &c., of collectors, com-ehends the forms collected by Linnæus, in 'Systema Naturæ,' under the genus *Arca*, l those designated by more modern zoo-ists as the genera *Arca*, *Cucullæa*, *Pec-culus*, and *Nucula*. "Cardinal teeth small, merous, entering, and disposed in each valve either a straight, a curved, or a broken line."

Arca (Linn.).—Animal more or less thick, erally rather elongated: mantle prolonging elf slightly backwards, and with a row of ten-ular filaments on its borders; labial appen-ges very small and slender; foot pedunculated, mpressed, and slit throughout its length. Shell vicular, rather thick, equivalve, inequilated, re or less oblique; umbones distant and often ttle recurved forwards; hinge linear; straight furnished throughout its length with a numerous row of small teeth or transverse laminæ, which are equal and intrant; ligment entirely external M. Rang, who gives the above as the characters of *Arca*, remarks that the species sometimes adhere by their foot, and more frequently by means of a byssus.

(6479) *A. tortuosa* (Genus *Trisis*, Oken). Shell twisted, parallelopiped, striated; valves obliquely carinated: umbones small, recurved. It inhabits the Indian Ocean.

(6480) *A. antiquata*. Shell transverse, obliquently cordate, ventricose, many ribbed; the ribs transversely striated and blunt: the posterior ribs bifid. Colour white.

The *Arcæ* have hitherto been found on bottoms of sandy mud and dirt, at depths varying from the surface to seventeen fathoms. Some of the species are moored to stones, corals, &c.—*Eng. Cyc.*

(6481) POLYPIFERA, POLYPIARIA, or POLYPI, an order of Radiate Animals, thus characterised by M Milne-Edwards:—Animals organised for sedentary mode of life, having no locomotive organs, and being provided with a circle of retractile tentaculæ around the mouth, and a central gastric cavity, not communicating with an anus, and containing the reproductive organs when these exist, in general fissiparous, or multiplying by buds as well as by ovules.—*Eng. Cyc*,

(6482) POLYPODIACEÆ are one of the chief divisions of the natural order of Ferns. [Filices.] They constitute the highest form of Aerogenous or Cryptogamic vegetation, and are regarded as approaching more nearly to Cycadaceous Gymnosperms than to any other part of the vegetable kingdom now in existence. They are usually herbaceous plants, with a permanent stem, which remains buried and rooting beneath the soil, or creeps over the stems of trees, or forms a scarcely moveable point of growth, round which new leaves are annually produced in a circle; or it rises into the air in the form of a simple stem, bearing a tuft of leaves at its apex, and sometimes attaining the height of 50 or 60 feet. [Aerogens.] The stems seem always to produce roots in great quantities from their surface, even when elevated in air; such roots are more especially met with near and under the ground, where they form a stratum of some thickness, acting both as feeding-organs and as an external protection; on all Tree-Ferns they appear upon the stem at least in the form of tubercles; and in *Cibotium Billardieri* they cover over the whole surface from the top to the bottom with a dense layer several inches deep. The surface of tree-fern stems may be taken to represent that of the order in general. It is always marked with scars of considerable size, having either a lozenge form or that of an irregular oval, and bearing within their area evident traces of the fracture of woody plates which passed from the stem into the leaves. These scars lengthen as the stem increases in age, till the lozenge or oval form is entirely destroyed; the scars then become separated to considerable distances, and extended into long and often irregular and indefinite spaces separated by deep furrows. Hence it happens that the appearance of the upper and lower end of the same tree-fern stem is so dissimilar, that they would not be supposed to belong to even the same species. Below the scars, or interposed among them, are found openings down into the interior of the stem filled with pulverulent matter, and of unknown use. They appear to be of the same nature as the apertures into the superficial cells of *Sphagnum*, or more especially as the perforations in the rhizoma of *Nymphæa*. Although tree-ferns are unknown in any countries except those having either a damp tropical climate, or at least an equable mild temperature and humid atmosphere, yet the common ferns of Britain, whose stems, vulgarly called roots, are formed under ground, exhibit the same kind of organisation as that just described, only in a less conspicuous manner. It does not therefore follow that the remains of tree-ferns found in this country in a fossil state prove Great Britain to have had formerly a tropical climate, especially as the number of such remains hitherto met with has been extremely small; the utmost value that can be assigned to their evidence is that of probability. In those tropical lands where the tree-fern acquires its full size, as for example Brazil, the Philippines, Pitcairn's Islands, &c., it becomes one of most majestic and graceful objects, having an enormous plume of the most delicate and verdant foliage at the extremity of a lofty flexible stem, which sways beneath the gentlest breeze.—*Eng. Cyc.*

(6483) POLYPODIUM, a genus of Ferns, type of the natural order *Polypodiaceæ*. The species of this genus are known by the thecæ being in clusters on the back of the frond, and by their opening transversely; the ring is usually vertical and incomplete. This is the case with *Allosurus* and *Noodsia*. *Polypodium* is distinguished by the sori being circular and naked, and the margin of the frond is flat, not reflexed. Several species are found in Great Britain. —*Eng. Cyc.*

(6484) POLYPODIUM. Reed Fern. There is a large terrestrial fern with hollow stems like a reed, which are often used by the natives of Tenasserim instead of quills for pens.—*Mason*. In Calcutta, the Hindoos boil the young tops of a *Polypodium* with their shrimp curries.—*Hooker*.

(6485) POLYPODIUM GIGANTEUM. A tree fern is very rare but is occasionally seen in the southern Provinces, resembling a small palm. Griffith found the same species in Assam. The natives have but one name for both the cycas and tree fern.—*Mason*.

(6486) POLYPODIUM PERTUSUM. Pitted Polypod. In Tenasserim, this fern is often found in company with the preceding species; and may be easily recognized by its creeping habit, and by the margins of the upper parts of its fronds being rolled together when in fructification.—*Mason*.

(6487) POLYPODIUM PROLIFERUM, is the only species of fern that the Soane valley presents at one season of the year. The rocks are then elegantly fringed with it.—*Hooker, Him. Jour Vol.* 1, *p.* 50.

(6488) POLYPODIUM QUERCIFOLIUM, Oak-leaved Polypod. In some parts of the forests of Tenasserim the trunks of almost every tenth tree have a great abundance of a large species of polypod growing upon them. The barren fronds are cordate, and stemless; but the fertile ones stand on long slightly winged stems, and are gashed like the leaves of an English oak. —*Mason*.

(6489) POLYPODUM SEKOUR, grows on the lower range of the hills, near Jowalla mukkee. Its dried roots are white, resembling slices of pears.—*Dr. Honigberger, p.* 330.

(6490) POLYPODUM TAXIFOLIUM. Lin.

Wellipanna-Kelengu Hort. Mal. | Kadehou Maa. Sans

Rheed says that the leaves of this plant, reduced to powder, and taken with honey, are powerful emmenagogues, and bring on abortions. He therefore adds, Mulieres, ergo, cavete vobis.—*Vide Horl. Mal. par.* 12. *page* 25.—*Ains. Mat Med. p.* 134.

(6491) POLYPODIUM VULGARE. Bisfay Common Fern is officinal at Lahore, whither it i brought from the hills. The Hakims use it t purge away the black bile in melancholy also i flatulent colic. They think it injurious to th liver.—*Dr. Honigberger, p.* 330. The root i brought to Ajmere from Arabia, via Bombay considered heating and given in flatulence, an indigestion; not considered poisonous in an quantity: one seer costs four rupees.—*Irvine*.

(6492) POMACEÆ, Juss. Apple Trib The Pomaceæ form a tribe of Rosaceæ in th system of De Candolle, but by many botanist they are separated into a distinct family. The may be distinguished from other Rosaceæ b their leaves being usually simple, the tube of th calyx adherent to the ovary; and thus, includin the carpels, a fleshy fruit is eventually formed which is crowned by the limb of the calyx, an is well known in the Apple, Pear, Quince, &c whence it is called a Pome. This may be fro 2—5 celled, each cell formed of cartilaginous bony membrane, and containing 2 or more erect ovules.—They mostly inhabit the North temperate Zone and the great mountainous range of India. They are chiefly remarkable for their edible fruit when cultivated, abounding in saccharine matter with a pleasant acidity. In a wild state, they are austere or astringent and acid. By distillation of the seeds of some of the Pomaceæ a very little Hydrocyanic acid is obtained.—*Royle*. A wild apple, which bears a small austere fruit like the Siberian crab was found in the Bhoottea country in East Nepaul.—*Hooker, Him. Jour. Vol.* 1, *p.* 205.

(6493) POMEGRANATE.

Rana Rooman. Arab.
Delunghidie, Cyng.
Grenades, Fr.
Granatapfel, Ger.
Anaar Darim, Guz. & Hind.
Granati, It.
Gangsalan, Jav.
Dalema, Mal.
Anaar, Pers.
Roomaas, Port.
Dadima, Sans.
Granadas, Sp.
Magilum palam, Tam.
Dadima Pundoo, Tel.
Nar, Turk.

The fruit of a tree (*Punica Granatum*), common in the warmer parts of the temperate zone. Pomegranates when ripe, are about the size of an orange, are covered with a hard, light brown rind, and contain a reddish, seedy, juicy pulp. The rind of the pomegranate has of late years formed an article of export from Bombay to England, where it is used in medicine.—*Faulkner*. In China, dried pomegranates are said to be used for dyeing yellow; the rind is also a tanning substance. In the "Comptes Rendus," xxxv., p. 558, there is an account by M. J. Persoz, of a green coloring matter from China, of great stability, from which it appears that the Chinese possess a coloring substance having the appearance of indigo, which communicates a beautiful and permanent sea green color to mordants of alumina and iron, and which is not a preparation of indigo, or any derivative of this dyeing principal. As furnished to M. Persoz by Mr. Forbes, the American consul at Canton, it was in thin plates of a blue color, resembling Japanese indigo, but of a finer grain, differing also from indigo in its composition and chemical properties. On infusing a very small quantity of it in water, this fluid soon acquired a deep blue colour with a greenish tinge; upon boiling and immersing a piece of calico on which the mordants of iron and alumina had been printed, it was dyed a sea green color of greater or less intensity according to the strength of the mordant—the portions not coated remaining white.—*Fortune*.

(6494) POMPHRET. Stromateus. *Linn.* This fish is very abundant on the Tavoy coast, and in a smooth sea may be seen deep in the water in great numbers, but they are very shy of the hook. They are considered one of the best fish for the table.—*Mason*.

(6495) POMPHRET. Stromateus Argenteus. Fish.

Vowal meen, Tam. | Hulva mahie, Duk.

Ains. Mat. Med. p. 155.

(6496) PONDIGUL SLATE, a dark black monumental marble is procurable in any quantity at the village of Pondigul, distant from Masulipatam about 70 miles, and from Hyderabad about 90 miles, situated on the Guntoor side of the river Kistnah, and in the Guntoor district. Slabs from 5½ feet by 3 feet and from 2 inches thick are to be had at but little cost and labour, and there are good bandy roads in most directions, but the cheaper and more feasible mode of conveyance would be, on flat-bottomed boats or rafts down the Kistnah to Masulipatam, from whence it could be shipped to all parts. J. S. Strlcke, P. A. A.—*Kimedy, 9th August* 1850.

(6497) PONERA (Latrelle), a genus of Insects belonging to the family *Formicidæ*. In this genus the neuters and females are armed with a sting. The peduncle of the abdomen is formed of a single knot; antennæ in these individuals thickened at the tip; mandibles triangular; head subtriangular. *P. contracta* is a small species, a native of England.—*Eng. Cyc.*

(6498) PONGAMIA. Of this genus Dr. Wight gives Pongamia elliptica, 420; glabra, 59; ovalifolia, 328.

(6499) PONGAMIA ARBOREA. From the seeds of the Pongamia glabra or Galidupa arborea, a honey-brown and almost tasteless oil is procured, which is fluid at common temperatures, but gelatinises at 55 degrees.—*Simmonds*.

(6500) PONGAMIA ATROPURPUREA; dark-purple pongamia. This tree is very common about Maulmain, and though vastly inferior to a multitude of others, Wallich thought it of sufficient beauty, to give it a place among his splendid engravings of rare Indian plants.—*Mason*.

(6501) PONGAMIA GLABRA. Indian Beech.

Poouga, Tam.
Canaga, Tel.
Hougay, Can.
Karung, Burm.

A graceful tree, and excellent for avenues: in good soil it attains a large size, has beautifully varnished green leaves all the year round; is valuable as a strong manure, for sugar-cane especially; requires no care.—*Dr. Cleghorn*. This large tree, attaining a height of 40 to 50 feet, is very common in S. India, flourishing equally well in the arid plains of the Carnatic, and on the Sub Alpine tracts of Mysore. Oil is made from the seeds. Roxburgh says the wood is light, white and fit for a variety of purposes. In Coimbatore it is used chiefly for fuel. The boughs and leaves are extensively used as manure. Wight No. 78, Travancore, 388, Bangalore, 55.—*M. E. J. R.*

According to Wallich, this, the karung oil tree, is indigenous in Amherst Province. The Burmese make an oil from this tree which may be the tree referred to by Wallich.—*Mason.* The wood said to be only fit for fuel Roxburgh on the contrary states that it serves for a variety of purposes. An oil is expressed from the seed.—*Rohde.*

(6502) PONTEDERA DILATATA. This much larger species is found in the neighborhood of Rangoon, and may exist in the Tenasserim Provinces.—*Mason.*

(6503) PONTEDERA VAGINALIS. PONTEDERA. The margins of many wild jungle streams in Tenasserim, are pimpled with a small species of the pontedera. It is

"A bonnie wee flower all wild in the wuds,
Like a wee twinkling star high up in the cluds,
Which opens its cups sealed up in the dew,
And spreads out its leaves of a beautiful blue."—
Mason.

(6504) PONTEDERACEÆ, *Pontederads*, a natural order of Plants belonging to the class of Endogens. It has a 6-parted tubular coloured perianth, more or less irregular, with a circinate æstivation. The stamens arising from the calyx 6 or 3 opposite the petals, the anthers turned inwards, opening lengthwise. The ovary is free, more or less completely, 3-celled, many-seeded; one style,the stigma simple. The capsule 3-celled, occasionally acquiring an adhesion to the perianth, 3-valved with loculicidal dehiscence; the seeds are indefinite, attached to a central axis; ascending hilum small; the embryo with its radicle rather enlarged, orthotropal in the axis of somewhat mealy albumen. The species aquatic or marsh plants. The leaves sheathing at the base, with parallel veins in the larger species, arrow-headed, cordate, or dilated. The flowers are either solitary or in spikes or umbels, spathaceous; frequently blue, sometimes yellow. The aquatic plants comprehended in this order are distinguished by the divisions of their flowers being rolled inwards after flowering, to which may be added mealy albumen and an indefinite number of seeds. They are natives exclusively of North and South America, the East Indies, and tropical Africa. Very little is known of their uses. Some of the species are employed by the native Indian practitioners in liver complaints and diseases of the stomach. Rubbed down in butter and drank,they are said to remove redness of the eyes; powdered and mixed with sugar, to relieve asthma; and when chewed, to remove tooth-ache; brayed with milk, some are adminstered in fever and some eaten as potherbs.—*Eng. Cyc.*

(6505) PONTOPHILUS, a genus of Shrimps. (*Egeon*, Risso.)

(6506) POOAH OR POEE FIBRE. *Kienki*, by the Lepchis: and *Yenki* by the Lomboos. *Boehmeria frutescens*; grows to the height of six or eight feet: and the fibre when properly dressed, is quite equal to the best flax of Europe, used for fishing nets, game bags; twine and ropes. It is considered well adapted for making cloth and canvas, it has great strength and endures wet well. Occurs near Simla. Boehmeria frutescens furnishes the well known Pooah fibre, or Pooah Hemp. It is called "Pooah" by the Parbuttias, "kienki" by the Lepchis; and "yenki" by the Limboos. It is not cultivated, but grows wild and abundantly in the valleys throughout the mountains of Eastern Nipal and Sikkim, at the foot of the hills skirting the tarai to the elevation of 1000 or 1200 feet and within the mountains up to 3000 feet. Dr. Falconer recognised this plant, as common from Gurhwal to the Sikkim hills; from the Ganges to Burrampooter. In the outer hills of Gurhwal Kumaon it is called Poee. It does not grow in the forest but is chiefly found in open clear places, and in some situations overruns the abandoned fields of the hill people, within the elevations which suit it. It sheds its leaves in the winter; throws them out in April and May; and flowers and seeds in August and September. The exact period altering of necessity with the elevation —*Royle, p.* 368. See BOEHMERIA.

(6507) POODEENA. Mentha Verticulata. Mint. See MINT.

(6508) POON-WOOD, OR PEON-WOOD, of Singapore is of a light porous texture, and light greyish cedar color; it is used in ship-building for planks, and makes excellent spars. The Calcutta poon is preferred. A species of *Calophyllum* is called *poona* in the peninsula of India, and C. angustifolium, Dr. Roxburgh says, is a native of Penang and of countries eastward of the Bay of Bengal, and that it yields the straight spars commonly called Poon, and which in those countries are used for the masts of ships.—*Tredgold.* The wood called poon brought from the East Indies, to Britain, very nearly resembles a dull coloured and greyish specimen of mahogany, and would be useful for any purpose to which such kind of mahogany is applicable; besides having a greater degree of strength and stiffness compared with its weight. Poon is used for the decks, masts, and yards of ships, and it appears to be well adapted for these purposes both by its strength and lightness. In respect to durability we have not been able to collect satisfactory information; its texture is porous, but uniform; and the mean weight of a cubic foot in the dry state is 405 lbs. taken from our specimens. The cohesive force of *poon* is from 10,000 to 14,700 lbs. per square inch, the mean weight of the modulus of elasticity for bars of an inch square is 1,689,800 lbs. The specific gravity, and the relative strength, stiffness, and resilient power compared with Riga fir, as 1000, from Mr. Fincham's experiments are, as under:—

Specific gravity.	Strength:	Stiffness.	Resilience,	
579	1380	1270	1400	Barlow.
647	1226	1230	1146	Fincham.
613	1303	1250	1273	Mean of both.

From whence it appears that it is superior to Riga fir in the properties required for most wood. The poon of commence, is said by Dr. Wight to be from the

Dillenia Pentagynia. Dilleniaceæ.

Rowadan Tel.

This is a large timber tree, a native of the Northern Circars: it flowers in March and April. *Roxb.—Rohde. M.S.S.* The similarity of native names between this and Calophyllum inophyllum led Dr. Wight to suspect some mistake. The wood of Dillenia pentagyna is said to be exceedingly strong, and very durable, even when buried under ground. A stately forest tree, common on the face of the W. Ghauts. Dr. Wight is satisfied that this is the tree which furnishes the Poon spars, D. pentagynia is a tall and calophyllum inophyllum a short stunted tree.—*Wight.*

(6509) POONAHLITE, a Mineral occurring crystallised in long slender crystals. Primary form a right rhombic prism Fracture uneven. Colourless. Hardness 5·0 to 5·5. Transparent, translucent. Lustre vitreous. Found in Poonah in the East Indies. The following is an analysis by Gmelin:—

Silica	45·120
Alumina	30·446
Lime	10·197
Soda, with a trace of potash	00·657
Water	13·386
	99·806

Eng Cyc.

(6510) POONGA OR KURUNJ OIL.—DALBERGIA ARBOREA OR PONGAMIA GLABRA.

Poonga yennai, Tam.
Kanoogoo noona Tel.
Kurunj ka tel. Hind.

This oil, which in some parts of the country is used to a large extent in adulterating lamp oil, is expressed from the seeds of a tree, common in most parts of the Madras Presidency. In North Arcot, Bellary, and the Nuggur Division of Mysore, the oil is procurable at Rs. 2-8-0 per maund. It is chiefly used as a Lamp oil by the poorer classes.—*M. E. J. R.*

(6511) POONEER.

Pooneer, Tam.

This is a very light white coloured earthy matter containing a great proportion of Carbonate of Soda, and from which, as well as from Over Munnoo, soda is prepared. Pooneer is employed in making glass, in dyeing blue and scarlet and also by the Chucklers in dyeing leather red.—*Ains. Mel. Med. p.* 192.

(6512) POOTROONGIE, A NEW OIL.

(6513) POVERASIE, *Tam.*

Santa Marie, Port.

And called by Europeans Ceylon Tulip-tree. It is used at times by the coachmakers for wheels, &c. It is a tree generally planted to ornament walks in gardens, and is very common: it produces a yellow flower.—*Edyc. Ceylon.*

(6514) POOVATHOO, a substance used in dyeing.

(6515) POPLAR,

Popelier, Dut.
Peuplier, Fr.
Pappel, Pappelbaum, Ger.
Pioppa, It.
Populus, Lat.
Alamo, Sp.

A fast growing tree (*Populus*), of which there are about fifteen varieties. The wood is soft and light, and not very durable, unless kept dry. It is used in the manufacture of domestic utensils, water-works, laths, and packing cases.—*Faulkner.*

(6516) POPPY OIL. PAPAVER SOMNIFERUM.

Cas-cas Yennai, Tam.
Casa casa Noona, Tel.
Khush-khash-ka Tael, Hind.

The poppy is largely cultivated throughout Malwa and the Opium districts, where the drying oil obtained from the seed is more extensively used than any other, both in lamps and as food. At Bhopaul the oil is procurable at the rate of Rs. 4 8 0 per maund of 25lbs. or £40 6 per ton. By simple exposure to the rays of the sun in shallow vessels, this oil is rendered perfectly colourless, and a very excellent sample of the bleached article exhibited by Lieut. Hawkes received Honorable Mention. It is much prized by European artists.*M.—E. J. R.*

(6517) POPPY SEED, CUSCUSS SEED, MAW SEED.

Gaysaggusa, Can.
Ying suh, Chin.
Abinatta, Cyng.
Capsules des pavots blanes, Fr.
Die kopse des weissen mohns, Ger.
Cuscuss, Guz. & Hind.
Kushkash, Arab.
Papavero, It.
Kes, Jap.
Kush-kush, Kooknar, Pers.
Post, Chosa, Sans:
Casa-casa, Tam.
Cassa-cassa, Tel:

The seed of a most important plant (*Papaver somniferum*), a native of the South of Europe and Asia Minor, and now naturalized by cultivation in India. Poppy seeds are employed in medicine for the preparation of a sedative decoction and syrup. In India they are used by the natives in sweetmeats, and by some classes of the Hindoos at some of their festivals. Poppy seeds are exported from Bombay to England and France.—*Faulkner.*

(6518) POPULUS (from the Latin *Populns*), a genus of Plants belonging to the natural order *Salicaceæ.—Eng. Cyc.*

(6519) POPULUS FASTIGIATA, the Lombardy Poplar. Leaf deltoid, wider than long, crenulated, glabrous, in the bud involutely folded, petiole compressed. This tree is readily distinguished among the species by its peculiar conical cypress like form, and the total absence of horizontal branches. It grows to the height of 100 and 120 feet, and sometimes 150 feet. It is a native of Italy on the banks of the Po, and also of Persia and the Himalaya.—*Eng. Cyc.*

(6520) PORANA. Of this genus Dr. Wight gives, Porana *paniculata*, 1376; racemosa, 1376; volubilis, 347-1376.

(6521) PORANA VOLUBILIS; BHOWREE, *Hind.*—A twining plant, flowers white, in axillary and terminal racemes; propagated by seed; requires no particular soil.—*Riddell.*

(6522) PORCELLANIDÆ, a tribe of Anomurous *Crustacea*, placed by M. Milne-Edwards next to the *Paguri*, and immediately preceding the section of Macrurous Decapods.—*Eng. Cyc.*

(6523) PORCELLANA (Lam). The general form resembling that of the *Brachyura.*—*Eng. Cyc.*

(6524) PORCELLANA SCULPTA. Colour reddish with great white spots. Length about three lines. It inhabits the coasts of Java. Two others species are recorded, one of them from the China seas: the other is *P. viridis*, Gray, 'Zool. Misc.' *Pisidia viridis*, Leach.—*Eng. Cyc.*

(6525) PORPHYRY. Felspar of a granular texture, without crystals imbedded, is Claystone; with imbedded crystals of felspar it is Porphyry. Hornblende mixed with uncrystallised felspar makes some Greenstones; with imbedded crystals of felspar this becomes Greenstone-Porphyry. Hence, by this mode of designation, we have Pitchstone-Porphyry, Greenstone-Porphyry, Basaltic-Porphyry, Felspar-Porphyry, andeven so vague a term as Trap-Porphyry; and, on the other hand, more correctly, Porphyritic Pitchstone, Porphyritic Claystone, Porphyritic Greenstone, Porphyritic Basalt, and Porphyritic Granite. Among volcanic rocks, Porphyritic Trachytes are common. Fine examples of porphyry (crystals of felspar in a base of uncrystallised felspar) occur in Scotland, at Inverary and in Ben Nevis; in Cumberland, on Armboth Fell; and in Cornwall, commonly under the title of Eurite.—*Eng. Cyc.*

(6526) PORCELAIN.

Tse-ki, CHIN. | Chenee-kain, GUZ., HIND.

A very fine species of earthern-ware, white, semi-transparent, and sometimes beautifully coloured and gilt. Chinese procelain, which is of an exceedingly fine texture, has long been renowned; but British porcelain, although unable to boast of such fine specimens of costly workmanship, has risen to be a matter of great importance. Dresden has long been famous for the beauty of its porcelain productions; but the finest and most magnificent specimens of European china, have been produced at Sevres in France. Sir John Davis has condensed all the important information concerning the materials and manufacture of porcelain,—a name given by the Portuguese to the semi-transparent cups they saw on their arrival, from their resemblance to the lustrous nacre of sea-shells, or *porcellana*, for they supposed it to be a composition of egg-shells, fish-glue, and scales—a good instance of the offhand descriptions travellers formerly indulged in, just as Chinese writers now describe things new to them; as, for instance, when they call caoutchouc elephant's skin. The Kaolin or *Kau-ling*, i. e. High ridge, the name of a hill near Jauchau fu, is obtained from the disintegrated granite in that region, and is nearly pure felspar, or such as contains no metallic substance; by slow decomposition the alkali and part of the silex is removed, and water imbibed. An analysis of the clay used in Europe, which probably does not differ materially from that employed in China, shows the constituents to be silica 43, alumine 36, water 19, and a trace of magnesia and carbonate of lime. The petuntse, or *peh-tun-tsz*,' is nearly pure quartz, and the best is brought from Hwuichau in Nganhwui, but is procurable elsewhere; it is reduced to an impalpable powder by toilsome processes, and formed into cakes to sell to the manufacturers. Steatite or soap-stone called *hwah shih*, is also employed, and some forms of carbonate and sulphate of lime, which are mixed in to produce an inferior article, though still among the best now manufactured; the soap-stone ware is more brittle than the other, but fine, white, and very light. The proportions of the ingredients vary according to the desired fineness of the ware. After the paste or biscuit is thoroughly mixed and formed into the required shape, the dishes are painted by workmen, each of whom takes a single color and a single part of the picture. The whole surface of the dish is sometimes covered with gay figures, but the most common decorations consist of heroes, statesmen, &c., in different attitudes and costumes, and sentences beautifully written referring to them and their times. Most of the inscriptions and figures seen upon mantel-piece ornaments, tea-cups, and jars, are of this nature, explaining some event in the life, or a panegyric upon the personage there represented; this affords an opportunity for persons to show their scholarship in explaining the quotation.—*Williams' Middle Kingdom, Vol.* II *p.* 116. The colors used on the fine porcelain have long been admired, and Deguignes, who made many endeavours to procure samples of them and ascertain the mode of mixing them, has given the composition of some of the principal colors, but at present there is probably little to learn from them in this branch. After the workmen have finished the painting, the pieces are covered with a liquid mixture of alkali, obtained from burning ferns with the quartzose petuntse, after which they are baked. The best articles are surrounded with a case lined with sand in order to protect them from the flame, and as the furnaces are only about six or eight feet square, the closest attention can be paid to the condition of the ware, and the exact time ascertained for reducing the heat and opening the kiln. Some of the pieces brought from the interior are perfectly white, and the patterns are afterwards painted and fixed on them according to the fancy of the customer. The finest specimens are from the kilns of King-eh-chin in Kiangse.—*Williams' Middle Kingdom, Vol.* II. *page* 117.

(6527) PORCUPINE: HISTRIX LEUCURUS. LARGE PORCUPINE. A large porcupine s not uncommon, in Tenasserim, but the precise pecies is not known. It is probably identical with one of the Malay species. The one found n Arracan is the common Indian species, and hat of Tenasserim, may possibly be the same.—*Mason.*

(6528) *Histrix alophas?* SMALL PORCUPINE. There is a small porcupine in the Tenasserim Provinces, which does not appear to have been iscovered in Arracan. According to native escription, it best accords with the small pecies described by Hodgson.—*Mason.*

(6529) PORTIA TREE OIL. THESPESIA OPULNEA.

Poorasum yennai, TAM.
Paris pippul, HIND.

This deep red coloured and somewhat thick il is obtained from the seeds of the portia tree, which grows in great abundance in the vicinity f Madras, and other parts of the Presidency. t is extensively planted as an avenue tree, for hich its quick growth and the beauty of its owers renders it a favorite. The wood is capable of being worked when fresh cut and is sed for boat building and cabinet work. The ice of the tree is used on the western coast, as remedy for various cutaneous affections, and e oil which is yet unknown to the natives, ight probably be of use in similar cases. Its xpense precludes its use otherwise than medicinally.—*M. E. J. R.*

(6530) PORTULACA OLERACEA. Lin.

orie Keeray, TAM.
iropoo keeray, TAM.
Loonia, HIND.

Is common in India, and eaten by the Hinoos; in Cochin China the seed is considered mollient and diuretic.—*Ainslie p.* 253. *O'Sh.* 353. A common weed; cultivated by the arket gardeners; used as spinach and in urries; almost tasteless.—*Jaffrey.*

(6531) PORTULACA. PORTULACEÆ. hese are pretty annuals with succulent leaves, and very brilliantly coloured flowers, red, purple, yellow, white, &c., they are easily grown from seeds, and if well watered and kept in the shade, will blossom throughout the hot season; the hybrids, between the white, and dark colours are remarkably pretty.—*Riddell.* This pretty little succulent annual, opens its flowers in the sun. It is raised from seed, requires a sandy soil. Is a native of the tropics; requiring little care as regards soil; should be watered sparingly at all times.—*Jaffrey.*

(6532) PORTULACA QUADRIFIDA Lin.

Posseric-keeray, also
Posselie-keera TAM.
Choroly ke baugee, DUK.
Batsali koora, TEL.
Oopadykee, SAN.
Bucklut-ul mobarik ARAB.
Chowlee, DUK.

Is fully described by Ainslie. The bruised fresh leaves are prescribed as an external application in erysipelas, and an infusion given in dysuria. —*O'Shaugh. p.* 353. A small troublesome weed with fleshy leaves, used as greens, common every where.—*Jaffrey.*

(6533) PORTUNIDÆ, a family of Brachyurous *Crustacea*, nearly allied to the Cancerians. The species are generally known by the name of Paddling Crabs. The general form of the *Portunidæ* does not ordinarily differ much from that of the greater part of the Cancerians; but the carapace is always but little elevated, and sometimes has a lozenge-shape. The Crustaceans of this group are for the most part essentially swimmers, and live often out at sea. They are vulgarly called Paddlers. The following genera are arranged under the tribe by M. Milne-Edwards:—

(6534) *Carcinus.* (Leach).
(6535) *Platyonychus.* (Latreille).
(6536) *Polybius.* (Leach).
(6537) *Portunus.* (Fabr).

(6538) *Portunus integrifrons,* (Cancer Navigator (?) Herbst) Carapace pubescent: length about 2 inches. It is a native of the Indian Ocean.

(6539) *Lupea.* (Leach).

(6540) *Lupea tranquebarica.* (Cancer olivaceus, Herbst: C. Serratus (?) Forsk. Portunus Serratus R. Ruppell; P. Tranquebaricus, Fabr. This, the largest portunian known, is six or eight inches in length, of a grayish green and inhabits the seas of Asia.

(6541) *Lupea pelagica.* (Cancer Pelagicus Linn. Cancer reticulatus and Cancer Cedonulli Herbst: Portunus pelagicus, Fabr. Length from three to four inches. Colour grayish-green with yellow spots, found in the Red Sea and the whole Indian Ocean.—*Eng. Cyc.*

(6542) *Lupea sanguinolenta.* Indian Ocean.
(6543) *Platyonychus* (Latreille).

P. bipustulatus. Length from two to five inches. It is found in the Indian Ocean.

(6544) *Portunus* (Fabr.).

(6545) POST, *Hind.* Post, which, properly speaking, is the Sanscrit and Hindoostanee name of the Poppy, Papaver somniferum, is also an appellation given, in the higher provinces of India, to an intoxicating liquor, prepared by beating the husks or capsules of the Poppy with Jaggery and water.—*Ainslie's Mat. Med. p.* 267.

(6546) POTASH, CARBONAS POTASSÆ IMPURUM.

Mara Ooppoo, TAM.

Impure Carbonate of Potash. *Potashes. Pearlashes.* This is prepared on the great scale by subjecting to the action of flame crude or black Potash, the *black salt* of American manufacturers. Instead of fusing it to make the *Potashes* of Commerce, the alkaline mass is transferred to a large oven-shaped or reverberatory furnace, where the flame is made to play over it; and being well stirred about, the black impurities are burnt out, and the mass becomes a caustic salt of a white colour (W. and B.) with a tinge of blue, and constitutes the *Pearlash* of Commerce. American Potash and American Pearlash (2), as ascertained by Vauquelin, contained in 1152 parts.

Caust. Hydr. of Potash.	857	Sulph. of Potash.	154	Chlor. of Potash.	20	Insol.	2	Carb & Aq.	119 parts.
(2)	754	„	80	„	4	„	6	„	308 „

Russian Potash yields 772 parts of Caustic Hydrate; it used to be very impure, but is now more carefully prepared. For commercial purposes it is extremely necessary to have modes of ascertaining the quantity of alkali contained in any specimen of Commercial Potash. This is done by the process of Alkalimetry.—*Royle.* The Hindoos on the Malabar coast, as well as the Cingalese, who do not use over Munnoo (Impure Carbonate of Soda), in bleaching and washing linen, employ for these purposes, the ashes of burnt vegetables (chiefly Cocoanut leaves), which can only, in this way, be of service, from the Potash they contain.—*Ains. Mat. Med. p.* 193

(6547) POTASH, CARBONATE OF; *Subcarbonate of Potash. Salt of Wormwood. Kali præparatum. F.* Carbonate de Potasse. *G.* Kohlensaures Kali. Potash, Salt of Tartar, Salt of Wormwood.

Potaske, DAN.
Jhar ke Nemuk, DUK.
Potassa, FR.
Pottasche, GER.
Jowkshar, GUZ. HIND.
Potassa, IT.
Potasz, POL.
Potasch, RUS.
Maraoopoo, TAM.
Manie oopoo, TEL.

A term commonly applied to an impure carbonate of potash, obtained by the incineration of wood, lixiviating the ashes in barrels, first with cold, and then with hot water, filtering the ley, and evaporating it to dryness in an iron pot. This constitutes the potash of commerce, which is in hard irregular masses or fragments, of a light bluish gray colour, somewhat caustic, alkaline taste, inodorous, and very deliquescent. Potash is of great importance in the arts, being used in the soap and glass manufactures, the rectification of spirit, bleaching, in medicine, and for other purposes. It is procurable in most Indian bazars.—*Royle. Faulkner.* This substance is of great importance but no manufacture of it upon an extensive scale has ever been attempted in India. The common source of it, is the ashes of land plants and the English market is supplied from Russia and America. If attention were directed to the manufacture of this Salt in India, it would form a very valuable article of export. A source of Pearl ash, and one very interesting to us, seeing the enormous quantities of Saltpetre all over the country, is Nitrate of Potass and Charcoal, a sample of Pearl ash from a refined Saltpetre got from the Gunpowder Manufactory, and the Gram-plant. Charcoal, also used in that establishment, was after one crystallization, superior to the best Russian or American article, giving by the alkalimeter 94 per cent of pure Carbonte.—*P.M.C.C.* As this salt is obtained by the burning of vegetables, it must have been know at very early times. Dioscorides describes it by the name τεφζακγημματινης, or *cinis sarmentorum*, ashes of vine-twigs. ("cineris lixivium" Pliny, xxxviii c. 51.) The Arabs are usually supposed to hav been the first to make known this alkali (al-*kali*) but the Hindoos, in works from which the Arab copied, made use of the ashes of plants. Potas is found in most of the alkaline earthy minerals as Mica, Felspar, Leucite, Nacrite: Carbonate o Potash has been found in a few mineral springs It is probably found in the juices of some plants But usually Potash is combined with other acids then forming Acetates, Malates, Oxalates, Tartrates, &c.

By incineration, the Oxygen of the vegetabl acid, combining with the Carbon of the vegetable substance, forms Carb., which, combinin with the disengaged Potash, forms a Carbonat of Potash. This, in its most impure state, is Potash of Commerce, or Rough Potash of Commerce. To obtain this, land plants are burnt countries where forests are most abundant, as America, Russia, Sweden, Poland. The wood i piled in heaps and burnt on the surface of th ground, in a place sheltered from the win "The ashes which are left consist of a solubl and insoluble portion. The *soluble* part is mad up of the Carb. together with the Sulphat Phosphate, and Silicate of Potash, and the Chl rides of Potassium and of Sodium; and the insoluble portion, of Carbonate and Sulphosphat of Lime, Alumina, Silica, the Oxides of Iron an Manganese, and a little carbonaceous matter th had escaped incineration." (Wood and Bache —*Royle.*

(6548) POTASSÆ BITARTRAS, L. E. I TARTARUM, D. Bitartrate of Potash. *Supertartra and Supertartrite of Potash. Cream of Tarta*

Argol. *F.* Tartrate acide de Potasse. *Ger.* Doppelt Weinsaures Kali.

Bitartrate of Potash (KO, 2 Tar, Acid, HO= 189) is well known by the name of Tartar, and must have been known ever since wine has been made from the grape, in the juice of which it exists. During the fermentation of wine, Sugar disappears and Alcohol is formed, and the salt not being soluble in this, is deposited on the bottom and sides of casks, as a crystalline crust, which, according to the colour of the wine, forms either *red* or *white Tartar* or *Argol*. This was known to the ancients, and is the Fæx Vini of Diosc. v. c. 13. (Hindoo Med. p. 97.) Its nature was determined by Scheele in 1769. It is largely purified both at Montpelier and at Venice.

Prop. The Bitartrate of Potash of commerce is in white crystaline crusts, formed of clusters of small crystals aggregated together, which are hard and gritty under the teeth, dissolve but slowly in the mouth, and have an acid and rather pleasant taste.—*Royle.*

(6549) POTASH, NITRATE OF: $KO\ NO_5$. This salt, also named *nitre* or *saltpetre*, is a natural product, but may be prepared by the addition of nitric acid to potash; or to carbonate of potash. The liquor, on being evaporated, deposits anhydrous crystals, which are six-sided prisms with dihedral summits. This salt is soluble in 7 parts of water at 60°, and in its own weight of boiling water. It has a cooling and saline taste, but has no action on vegetable colours. It fuses at a temperature below redness, and is completely decomposed under a strong heat. When mixed with combustible matter and heated, or thrown in a fused state on many metals, rapid oxidation takes place at the expense of the oxygen of the nitric acid. Gunpowder is an example of such a mixture, and there are many such in various pyrotechnic compositions, which burn independently of the atmospheric air, and even under water, oxygen being abundantly supplied by the nitric acid. In India, Egypt, and some other warm countries, after the rainy season, nitre is produced on the surface of the soil in the form of a white efflorescence. The soil is removed to the depth of about an inch, and treated with water, which dissolves the soluble salts. The solution is made in large basins or tanks; rapid evaporation takes place under the influence of the solar heat, and is completed by means of artificial heat: as the solution cools, a considerable quantity of nitrate of potash is deposited in large crystals. This forms *rough Indian nitre.* The mother liquor is thrown away; it contains a considerable quantity of nitrate of lime and magnesia, and might still furnish nitre if mixed with potash salts. Bengal and the neighbourhood of Patna are the sources of the largest portion of the saltpetre supplied to the European market from Hoogly, but the Madras Presidency furnishes large quantities of the best quality. In Hungary there are saltpetre pits, and in some parts of Spain the soil becomes incrusted with this substance. Nitre is also obtained from certain natural caverns occurring in the limestone rocks of the island of Ceylon: the walls become covered with a nitrous efflorescence, which is detached, during six months of the year, with picks, together with a small portion of the rock which contains felspar, and this is doubtless the origin of the potash. The fragments are pounded, mixed with an equal portion of wood-ashes, and water is poured upon the mixture. The nitrates of the earths part with their acid to the potash in the ashes, and the earths are precipitated as carbonates of lime and magnesia. The clear decanted lye, containing the nitre of the ashes as well as that of the rock, is evaporated in pits exposed to the sun, and then in pans by the action of fire. The crude saltpetre, which crystallizes in cooling, is then fit for exportation. Similar caves exist in Italy, on the coast of the Adriatic, in North America, Africa, Teneriffe, &c. In France, nitre was formerly produced artificially in what are termed *nitre-beds*, by the oxidation of ammonia in the presence of a powerful base. Animal refuse of all kinds was mixed with old mortar, or hydrate of lime and earth, and the mixture was placed in heaps under a cover of some kind, to keep off the rain, but with free exposure to air. The heaps were watered from time to time with stale urine, and the mass was turned over in order to expose fresh surface to the air. When a considerable quantity of the salt had been formed, the mixture was lixiviated, in troughs of oakwood.

The rough nitre, as imported into Great Britain from the East Indies, is in broken crystals of a brown colour, and more or less deliquescent. The loss which it sustains in refining is termed the *refraction*, and can only be ascertained by analysis; but it is not easy to obtain a fair sample of a cargo. "The samples which the merchants and brokers select for analysis, generally consist of portions drawn from each bag and afterwards mixed together, and if carelessly or unfairly taken, or exposed so as to become more moist or more dry than the bulk, the report of the analyst is often unsatisfactory. He should work upon not less than 20 to 30 lbs. of such sample, which should be ground or triturated so as to produce a properly uniform mixture of the whole, for it often includes lumps of pure nitre or of other salts: from 100 to 1000 grains of this mixture is then taken for analysis. The moisture is determined by the loss occasioned by careful drying on the sand-bath: it is then dissolved in water and tested, so as to acquire some general notion of the impurities; and by means of nitrate of silver, nitrate of baryta and oxalate of ammonia, the proportion of chlorine, sulphuric acid, and lime may be determined: the lime is generally in the state of sulphate, and more or less sulphate of potassa is also usually present. The chlorine is chiefly derived from the chlorides of potassium and sodium. Another portion of the sample should be dissolved in about thrice its weight of boiling water and filtered, by which any sand or other insoluble impurities are collected: the salt should then be crystallized in the usual way, during which the appearances and forms of the successive deposits will indicate, to the experienced eye, the nature of the foreign salts present, among which nitrate of soda, sulphate of potassa, sulphate and nitrate of lime, and chloride of sodium and potassium, with traces of chloride of calcium, and sometimes of a peculiar organic matter, are frequently found. It will be obvious that the accurate quantitative analysis of such a mixture of salts is not a very easy problem; and yet the separation of nitrate of soda from nitrate of potassa, and of chloride of potassium from chloride of sodium, are essential steps, as the value of the sample is affected by their relative proportions: for nitrate of soda, to say nothing of its unfitness for the manufacture of gunpowder, is cheaper than nitrate of potassa; and chloride of sodium is of no value, whereas chloride of potassium is purchased by the alum-makers; so that a sample of nitre, containing the latter salt, is in this respect worth more than where it only contains common salt. But inasmuch as the equivalent of chloride of sodium is only 60, and that of chloride of potassium 76, it is obvious that if the whole of the chlorine, as indicated by the weight of the chloride of silver, be considered as in combination with sodium (part of the sample consisting of chloride of potassium), the refraction will be estimated below the mark. Hence the necessity of ascertaining the relative proportions of both chlorides, which is best effected by converting them into sulphates and separating them by crystallization."

The refining of nitre on a large scale is founded on the property that its solubility increases rapidly with the temperature, while the solubility of the chlorides of sodium and of potassium remains nearly constant. For example, about 25 cwt. of rough nitre is dissolved in a large copper boiler in 150 gallons of water; the heat is gradually raised, and fresh portions of nitre are added until about 60 cwt. have been dissolved. The solution is kept stirred, and the scum removed. The water in the boiler, when raised to the proper temperature, is sufficient to dissolve the whole of the saltpetre, but not the whole of the foreign salts: a large portion of the chloride of sodium subsides, and may be scooped out of the boiler. 100 gallons of water are then gradually added so as not to cool the solution too much; 2¼ lb. of glue dissolved in warm water are then poured in, and the whole thoroughly agitated. The glue thus diffused through the liquid becomes entangled with the organic substances which rendered the solution viscous, and rises with them to the surface in the form of scum, which is carefully removed, and after boiling for some time, the liquor becomes clear. The fire is then withdrawn and the temperature let down to about 195°, when the liquor is carefully dipped out and removed to the crystallizing vessels. The liquor must be disturbed as little as possible during this operation, in order not to suspend the crystals of common salt deposited at the bottom. The crystallizing vessel is a shallow copper vessel, the edge of which is firmly screwed to a platform of oak.—*Tomlinson.*

(6550) POTASSIUM.

Potassium, Fr.
Kalium Kali metall, Ger.

Is a soft malleable metal. It is silvery white, and immediately tarnishes when exposed to the air, from its great affinity for oxygen, which it will take also from water, swimming and burning upon it with great brilliancy, and being converted into potash while the hydrogen escapes. It is preserved in fluids, such as petroleum, naptha, &c., as they contain no oxygen.—*Royle, Faulkner.*

(6551) POTATOES.

Ruta innala, Cyng.
Aardappelen, Dut.
Patate, Fr.
Kartoffel, Ger.
Puttata, Aloo, Rutal, (sweet potatoes) Guz. Hind.
Patate, It.
Aloo, Pers.
Batata, Port.
Jabloki semlenne, Patata, Rus.
Patata, Sp.
Wallarai kilangoo, Tam.
Ooralay-gudda, Tel.

The roots of the Solanum tuberosum, of innumerable varieties.—*Faulkner*. Potatoes, are cultivated for the tubers attached to the roots. Those cultivated on the plains of India are hardly fit for human food, in consequence of their never arriving at maturity, they ought to succeed well on the hills; but wherever grown they will do little good if repeatedly planted on the same spot of ground, they require a change every year, propagated by division of the tuberous roots.—*Jaffrey.* This vegetable is now generally cultivated all over the Deccan, but was a few years ago confined to Surat and Seroor. The former was generally the finer, and could only be had during the cold season; but now the potatoes are grown all the year round: on the Neilgherry and Mahabuleshwar hills they are in abundance. They should be planted in rows about one foot apart, and five or six inches deep; the space between each row, if ground can be spared, eighteen inches, otherwise a foot. The ground should be light and loamy, and as little infested with white ants as possible. They can be sown at the commencement of the rains, and a spot should be selected where the water cannot lodge, but be easily let off; which may be done by keeping the end of the channel between the ridges open. At this season, plant your potatoes on the top of the ridges, and do not water them unless necessary, as too much water makes them run to stalk. If your ground has not been well ploughed previous to the rains setting in, and all the weeds destroyed, the chance is your crop will fail; but should you have your ground ready, take your potatoes, intended for seed, and cut them into pieces, taking care that each slice has at least two eyes in it; and as you cut the slices, whilst fresh, dip the cut side of each into wood-ashes, and let them dry well, which takes place in a few hours: this prevents the white ant's attacks. Sow each slice from nine to twelve inches apart, and place by the side of each a small clove of garlic, which in some measure tends to prevent the attack of a large grub very destructive to the plant. Dr. Riddell thinks this insect's eggs must be in the manure when added to the soil, and has little doubt but that if the manure was previously worked up with the soil two or three times during the hot season, and exposed to the heat of the sun, the eggs would be destroyed: or the same purpose might be effected with a little fresh lime. He is sure the caterpillar does not travel to the plant.

The finest crops in the Deccan are sown from the beginning of October to the latter end of December, and this last crop will be found the most productive. Fine crops of potatoes have been grown where hemp has been first sown, and when about two feet high ploughed up into the ground. If, when your potatoes are about flowering, you perceive any of the stalks wither, carefully open the earth and look for a grub, which you may be certain is feeding upon it—of course destroy it. When these grubs are very numerous, it is necessary to search all the drooping plants daily: his idea is, that the larvæ is brought with the manure, and is the deposit of a beetle—however, nothing can be done but destroying them. He has heard recommended a bag with a small quantity of assafœtida to be placed in the water-course, as a remedy, when the plants were being irrigated. Another insect deposits its egg on the stalk of the plant. In the rains a small caterpillar eats its way into the stalk above the ground, when the plant immediately droops: the remedy is to remove the whole. Be careful at all seasons to keep the stalks well earthed up, and let the potatoes have a moderate supply of water—of course the season must be your guide. He, one year, at Kunlur, raised a very fine crop of potatoes during the rains, by sowing them on ridges, and only watered them at first in consequence of want of rain: they were sown in the beginning of July, and a few taken up in September (the atter end). Some of the potatoes weighed from five to seven ounces, and were equal to any seen grown on the Hills. In the latter end of August, by way of experiment, he tore off shoots from the lower end of the stalks, when they were abundant, and planted them in rows, the same distance as for seed; and in November, on taking them up, was gratified by finding four or five large potatoes produced by each stalk, the size of a duck egg. This plan he strongly recommends to those persons who may not be able to get fresh seed after the rains. He did not find that the rows of potatoes from which the slips were taken produced fewer potatoes in consequence, as he weighed the whole and kept a memorandum in his journal.—*Riddell.* Amongst tuberous rooted plants, which serve as food for man in various quarters of the globe, the principal are the common potato, yam, cocoes or eddoes, sweet potatoes, taro, tacca, arrowroot, cassava, or manioc, and the Apios (*Arracacha esculenta*). There are others of less importance, which may be incidentally mentioned. The roots of *Tropæolum tuberosum* are eaten in Peru, those of *Ocymum tuberosum* in Java In Kamschatka they use the root of the *Lilium Pomponium* as a substitute for the potato. In Brazil the *Helianthus tuberosus*. The rhizome and seed vessels of the Lotus form the principal food of the aborigines of Australia Many other plants and roots, furnish farinaceous substance and support in different countries. The comparative amount of human food that can be produced upon an acre from different crops, is worthy of great consideration. One hundred bushels of Indian corn per acre is not an uncommon crop. One peck per week will not only sustain life, but give a man strength to labor, if the stomach is properly toned to the amount of food. This, then, would feed one man 400 weeks, or almost eight years! 400 bushels of potatoes can also be raised upon an acre. This would give a bushel a week for the same length of time; and the actual weight of an acre of sweet potatoes (*Convolvulus batatas*) is 21,344 lbs., which is not considered an extraordinary crop. This would feed a man (six pounds a day) for 3,557 days, or nine and two-third years! To vary the diet we will occasionally give rice, which has been grown at the rate of 93 bushels to the acre, over an entire field. This, at 45 lbs. to the bushel, would be 4,185 lbs.; or, at 28 lbs. to the bushel when husked, 2,604 lbs., which, at two pounds a day, would feed a man 1,302 days or more than three-and-a-half years! The common English or Irish potato (*Solanum tuberosum*), so extensively cultivated throughout most of the temperate countries of the civilised globe, contributing as it does to the necessities of a large portion of the human race, as well as to the nourishment and fattening of stock, is regarded as of but little less importance in Britain's national economy than wheat or other grain. It has been found in an indigenous state in Chili, on the mountains near

Valparaiso and Mendoza; also near Monte Video, Lima, Quito, as well as in Santa Fe de Bogota, and more recently in Mexico, on the flanks of Orizaba. Notwithstanding its utility as a food had become better known, no high character was attached to it; and the writers on gardening towards the end of the seventeenth century, a hundred years or more after its introduction, treated of it rather indifferently. "They are much used in Ireland and America as bread," says one author, "and may be propagated with advantage to poor people." The famous nurserymen, London and Wise, did not consider it worthy of notice in their "Complete Gardener," published in 1719. But its use gradually spread as its excellencies became better understood. It was near the middle of the last century before it was generally known either in Britain or North America, since which it has been most extensively cultivated. The period of the introduction of the common potato into the British North American colonies, is not precisely known. It is mentioned among the products of Carolina and Virginia in 1749, and by Kalm as growing in New York the same year. The culture of this root extends through the whole of Europe, a large portion of Asia, Australia, the southern and northern parts of Africa, and the adjacent islands. On the American continent, with the exception of some sections of the torrid zone, the culture ranges from Labrador on the east, and Nootka Sound on the west, to Cape Horn. It resists more effectually than the cereals the frosts of the north. In the North American Union it is principally confined to the Northern, Middle, and Western States, where, from the coolness of the climate it acquires a farinaceous consistence highly conducive to the support of animal life. It has never been extensively cultivated in Florida, Alabama, Mississippi, and Louisiana, probably from the greater facility of raising the sweet potato, its more tropical rival. Its perfection, however, depends as much upon the soil as on the climate in which it grows; for in the red loam, on the banks of Bayou Bœuf, in Louisiana, where the land is new, it is said that tubers are produced as large, savoury, and as free from water as any raised in other parts of the world. The same may be said of those grown at Bermuda, Madeira, the Canaries, and numerous other ocean isles. The chief varieties cultivated in the Northern States of America are the carter, the kidneys, the pink-eyes, the mercer, the orange, the Sault Ste. Marie, the merino, and Western red; in the Middle and Western States, the mercer, the long red, or merino, the orange, and the Western red. The yield varies from 50 to 400 bushels and upwards per acre, but generally it is below 200 bushels. Within the last ten years an alarming disease, or "rot," has attacked the tubers of this plant, about the time they are fully grown. It has not only appeared in nearly every part of America, but has spread dismay, at times, throughout Great Britain and Ireland, and has been felt more or less seriously in every quarter of the globe. To the greater uncertainty attending its cultivation of late years, must be attributed the deficiency of the United States crop of 1849, as compared with that of 1839. This is one of the four agricultural products which, by the last census, appears smaller than ten years since.—("American Census Reports for 1850.") The crops in Ireland, where the potato is the principal object of culture, vary from 1½ to 10½ tons per acre, according to the season; but in the average of three years ending 1849, the annual growth of Great Britain and Ireland amounted to nine million tons, which, at £3 per ton, exhibits the value at £27,000,000 sterling. Ireland produced in 1847 a little over two million tons, the yield being 7¼ tons per acre. In 1848 the produce was 2,880,814 tons, averaging only four tons to the acre. In 1849, 4,014,122 tons, averaging 5½ tons to the acre. In 1850, 3,954,990 tons; and in 1851, 4,441,022 tons; the average yield per acre not stated. In many parts of Scotland 24 tons to the acre are raised. The sales of potatoes in the principal metropolitan markets exceed 740,000 tons a year, which are irrespective of the sales which take place at railway stations, wharfs, shops, &c. The imports into the United Kingdom average about 70,000 tons annually. Potatoes are exported to the West Indies, Mediterranean, and other quarters. For emigrant ships, preserved or dried potato flour is now much used. Thoroughly dried potatoes will always produce a crop free from disease. Such is the positive assertion of Mr. Bollman, one of the professors in the Russian Agricultural Institution, at Gorigoretsky. In a very interesting pamphlet, Les Moyens deprevenir la Maladie des Pommes de Terre. Experiences et Conclusions de A. N. C. Bollman, Conseiller d'etat, Professeur, &c. 8vo, St. Petersburg, 1853. By this gentleman, it is asserted as an unquestionable fact, that mere drying, if conducted at a sufficiently high temperature, and continued long enough, is a complete antidote to the disease.—*Simmonds.*

(6552) POTEE, round red cakes of cotton The inferior kind is impregnated either with th red colouring matter of the prickly pear, a bette kind is made by impregnating the cotton with th kaysur flower, the weeping Nyctanthus, *N. arbortristis*, but the best is from the Safflower, *Carthamus tinctorius*. The Potee forms a ready an durable substitute for red ink.

(6553) POTENTILLA. Of this genus Wight gives Potentilla Leschenaultiana, 990 Mooniana, 233.

(6554) POTENTILLA ATROSANGUINEA These are herbaceous plants, and handsom when in flower, they grow in any garden soil, the colours are various, and easily raised from seed, or by dividing the roots, the shrubby species grow from two to three feet high.—*Riddell.*

(6555) POTENTILLA DENTICULOSA, is common in the plains of Northern India in the cold season, and at elevations of 4000 to 5000 feet in the Himalayas; two other species are found in the Neilgherries.—*Royle, page* 202. *O'Shaughnessy, p.* 325.

(6556) POTENTILLA OFFICINALIS. Roxb. Fl. Ind. i. p. 431. SYN. Scindapsus Officinalis.

Vushira, SANS. | Guj-pipul, BENG.

A large creeper, the fruit cut in thin transverse slices is the *guj-pipul* of the bazars, and highly esteemed as a stimulant tonic.—*O'Shaughnessy, p.* 626.

(6557) POTENTILLA TORMENTILLA. Πενταφυλλον μελαν, *Diosc.* and *Theopr.* A native of Europe, and officinal; the root is very rich in tannic acid.—*O'Shaughnessy, p.* 325.

(6558) POTHOS. Wight gives Pothos decursiva, 770; heterophylla, 777; officinalis, 778: peepla, 780; pertusa, 781; scandens, 776;

(6559) POTTA DELL. A soft, coarse, open-grained, light Ceylon wood.

(6560) POTTERY, *Encaustic Tiles, Cements.* The art of fashioning clay into vessels of a variety of shapes, and hardening it by the action of heat, is one of the most ancient of the arts. Fragments of pottery are everywhere found among the ancient cities of India, as in those of other parts of the world; pottery, as Brogniart has remarked, affording the best record of the early ages of man, as bones do of the earth.—*Royle, Arts &c. of India page* 476. So little is known of Indian pottery that it is usually described as be-ng hemispherical in shape. Some of it is no loubt so, for the convenience of being carried on he head; but it is a fact, that in the recent exibition of Indian pottery, numbers of the best udges have greatly admired its elegant, even lassical gracefulness of form. It is also stated to e black, and red, or yellowish. The clays which re generally employed in the more populous art of the country, Dr. O'Shaughnessy has obrved, "contain so much oxide of iron and caronate of lime that the vessels melt into a slag t a temperature little above that of redness." Deposits of a black stiff clay, containing much egetable matter, occur in some districts; vesels made with it sustain a higher temperaure." Clays capable of bearing great degrees f heat have, however, been discovered in ifferent parts of India. As one great object to have porous vessels for cooling water, the rdinary clays answer sufficiently well for this urpose; and some of the forms, as that of the rtoise shaped, expose a larger surface to the air. he Hindoos, moreover, never use a vessel the second time, so no great expense will be incurred by them; thus encouragement is wanting to improve the nature of their pottery. But very successful experiments have been made to make improved pottery in India, as by Mr. Julius Jeffreys, the ingenious inventor of the respirator, who succeeded in making stone ware, soda-water bottles, crucibles, fire bricks, tiles, &c., which seem to have been glazed by the silica uniting with the alkaline ashes of the furnace. Dr. O'Shaughnessy greatly improved the pottery in use in the dispensary of Calcutta, and which he glazed with the borate of lime. The glazed pottery of Pegu, of which two very large jars were sent, has long been known for its glaze not being affected by acids. Dr. Hunter sent some excellent specimens of pottery from the School of Arts at Madras, and for which a prize was awarded. The ancient potter's wheel is the instrument with which the Hindoo works; and while it revolves, with the aid of his naked hands he fashions vessels of elegant forms, many of which have been admired as being of classical shapes, and some would appear almost as if they were of Etruscan origin: but there is no reason to believe that the Hindoos have ever had anything but their own unerring taste to guide them. This beauty of form is equally conspicuous in the pottery of Sewan near Patna, as in that of Azimgurh or of Ahmedabad, of Mirzapore, or of Moradabad.

Some of it is remarkable, also, for its extreme thinness and lightness, showing the great skill of the artist, and making it difficult to understand how it kept its shape when in a plastic state, as I cannot learn that the turning-lathe is used to give a finish to any of the articles. The painted pottery of Kotah, and the gilt pottery of Amroha, have also been admired. The handles and the various ornaments of the Ahmedabad pottery are no doubt attached, as in Europe, by means of slip. From the specimens of basket-work pottery sent, there is no doubt that, with better materials and a little instruction the natives could excel in this as in the forms of their pottery. If we had no other information, we might yet infer from the crucibles employed by the goldsmith, by the workers in brass, and by the makers of cast steel, that some very infusible clays are to be found in India; but recent investigations have proved that crucibles and firebricks, superior in infusibility to those made of Stour-bridge clay, have been made in India; and from the white goblets of Arcot, and the light-coloured pottery of Madras, as well as from the white bricks sent from the Ceded Districts, we see that there are many useful clays without the usual admixture of iron. —*Royle, Arts &c. of India page* 478. As connected with pottery might be mentioned the variously coloured *Encaustic* tiles, which have been used for the domes of some of the tombs near Delhi and Agra, as well as in Southern India; but I cannot learn that the art is at present practised. It was probably introduced by the Mahomedans from Persia.

The art of making *pottery*, or vessels of baked earth, is so ancient and so universal that we seek in vain for any precise information as to its origin. It is alluded to in that most ancient record, the book of Job, and is also repeatedly mentioned in other parts of the Scriptures. The potters of Samos were celebrated in the time of Homer; and great quantities of pottery have been found in Egyptian tombs, which, to all appearance, have lain unopened since the time of the Pharaohs. The earliest use of pottery was doubtless that of ordinary drinking vessels; but there was also a religious employment assigned to earthen vessels, which has been the means of preserving them for the inspection of after generations. In vases of baked earth the ashes of the dead were frequently deposited, and even where the practice of burning the dead was not followed, still various earthen vessels have been found placed at the head and feet of the skeleton, and sometimes hanging on pegs along the sides of the tomb. Thus among many distant nations, having different languages, manners, and superstitions, pottery was considered a necessary part of the furniture of tombs. The potter's art is extremely valuable in an antiquarian point of view. While metal is liable to corrosion, and wood to decay, pottery remains almost unalterable, and has thus been the means of discovering to later ages many points respecting the history, religion, customs, and manners of the ancients, which must otherwise have remained unknown. The potter's art is represented in all its stages of the tombs of Thebes. The mixing of the clay was effected by kneading with the feet; after which a mass of convenient size was formed with the hand, and placed on a wheel of very simple construction, and turned with the hand. During its revolution the forms of the vessel were made out with the finger; the handles were afterwards affixed; the objects were placed on planks to dry, then carefully arranged in trays, and carried to the oven. Ornamental designs were traced with a wooden or metal instrument previous to the baking. There is a general agreement in the nature and uses of ancient pottery, but at the same time a distinctive character belonging to each country and nation. In this distinctive character consists the value of pottery in an historical point of view. The rude and simple urns of the early inhabitants of these islands; the more carefully fashioned pottery of the Romans with which our country abounds; the simple unglazed earthenware of ancient Greece; the more elaborate forms called Etruscan, of which the finest specimens are, however, attributed to the Greek potters of the Isle of Samos, so celebrated for the delicacy and perfection of their workmanship; the red and black potteries of India; the black and white potteries of North America, the latter interspersed with fragments of bivalve shells; the irregularly formed and fanciful pottery of South America;—all these possess a distinct individuality which makes them clearly recognisable by the student of this interesting art, while it reveals many valuable facts, taken in connexion with the localities in which they are found, their greater or less simplicity, their modes of ornamentation, and the relics which they frequently enclose. On the discovery of the extraordinary ruins of Mitla and Palenque, in Mexico, not many years ago, numerous specimens of pottery were met with, of a remarkably advanced kind for the period assigned to those ruins, namely, one thousand years before the Christian era. These potteries, although made without the turning lath, are ornamented in different colours, well baked, and covered with a fine vitreous glaze, such as was unknown to Europeans until about ten centuries ago.

As other branches of art advanced, so the potter's art became more and more developed, until at last a very fine hard description of pottery, thin and translucent, was invented and manufactured under the name of *porcelain*, a word, according to some, derived from *porcellana*, the Portuguese for a drinking-cup; according t others, from the Italian word *porcellana*, a univalve shell, of the genus *cypræidæ* or *cowries* having a high arched back like that of the hog (*parco*, Ital.), and remarkable for a white smooth, vitreous glossiness of surface. This i the more probable derivation, since there i abundant evidence that the word *porcelain* existed in the French language in the fourteenth century, and consequently anterior to the introduction of Chinese porcelain into Europe. Porcelain is of comparatively recent origin in Europ yet it was commonly known in China more tha a century before the Christian era. It was no until four or five centuries after that perio however, that fine materials were employed, an that some degree of perfection was attaine Still taking the later date, the porcelain China as a high antiquity, and must have bee made at least 1250 years before our English porcelain. When the Chinese had acquire a certain amount of skill and perfectio they appear to have rested entirely satisfied wit the results, and to have continued producin them without variation for ages. So exclusive were the Chinese the manufacturers of porcelai that it acquired the name of their land, and became universally known (on its introduction Europe in 1518) as *China*. For a long peri it was also erroneously supposed that the fi clay necessary for the production of good po celain, consisting of silica and alumina in vari ble proportions, and called by the Chine *kaolin*, was peculiar to their land, and th consequently no country in Europe could hope to attain eminence in this manufacture.

The cermaic [Κέραμος, *potter's clay*, is supposed by some to be derived from κεράννυμι, *to mix up*. Others derive it from κέρος an animal's *horn*, used as a drinking-cup. Others, again, suppose t to be from ἔρο, *earth*.] art, in its widest sense, ncludes the preparation of all articles in clay or rgillaceous matters, which are submitted to the ction of fire ; so that a comprehensive treatise n the subject would include the manufacture of ricks and tiles, as well as of the choicest specinens of pottery and porcelain. The essential ngredients in every kind of clay, and, consequently, in every article in pottery and porcelain, re silica and alumina. [See CLAY.] The pure ompound *silicate of alumina* is, it is true, an deal type ; since no clay, or artificially prepared ottery or porcelain paste, is ever free from admixture with other ingredients, such as iron, ne, potash, &c. If, however, we remove from he paste either the silica or the alumina, we ender it useless for the purposes of the potter ; ut by purging the paste of the accidental ingredients, the iron, lime, &c., we exalt those roperties which render it fit for the preparation f fictile articles. An intimate mixture of silica nd alumina with water acquires, by exposure o a high temperature, the required degrees of ardness and density ; but for many purposes it necessary to impart a certain degree of fusiility, to which end other substances are used in arious proportions, capable of forming vitrifiale double silicates with alumina and silica. hese substances, diffused through the paste rmed by the simple silicate of alumina, in some ases with silica in excess, in others with excess alumina, greatly contribute to the cohesion nd hardness of the mass. The various mixtures nployed in the different branches of the manucture, have been thus classified by M. Dumas :—

lica, alumina	Ideal type.
lica, alumina, lime..................	Earthonwares, crucibles bricks, tiles encaustictiles and common pottery.
lica, alumina, oxide of iron... ...	
lica, alumina, lime, oxide of iron.	
lica, alumina, potash.................	Hard porcelain
lica, alumina, soda.....................	Soft porcelain.
lica, alumina magnesia	Piedmont porcelain.
lica, alumina, baryta................	Stoneware.

(6561) PRABANATHA. SEEDS OF CASSIA ORA : *Ben. Phar.*

(6562) PRANGOS, a genus of Plants of the tural family of *Umbelliferæ*, tribe *Smyrneæ*, so med by Dr. Lindley from the name by which e only species is known in its Tartarian habit, where it was discovered by Mr. Moorcroft, the neighbourhood of Imbal or Droz, and hich he visited for the purpose of examining to the reputed qualities of this plant, of which e accounts seemed to border on exaggeration. lmost all the knowledge which we possess reecting the plant, is derived from the observaons of that lamented and enterprising traveller. The Prangos Hay-Plant is herbaceous and perennial, having a large fleshy root stalk, usually measuring at the top from 18 to 22 inches in circumference, and formed by the aggregation of an infinite number of crowns or winter-buds, clustered together at or above the surface of the ground. These crowns being closely covered by the fibrous remains of the old leaves, are thus protected from the frosts of winter. The crop consists of the leaves, which rise in abundance from each crown, are finely cut, about two feet in length, and have a highly fragrant smell, extremely similar to that of very good new clover hay. This Mr. Moorcroft considered as a most important and interesting object of rural economy, and says that the properties of Prangos as a food appear to be heating, producing fatness in a space of time singularly short ; it is also destructive to the *Fasciola hepatica*, or Liver-Fluke, which in Britain, after a wet autumn, destroys some thousands of sheep by the rot. The last mentioned property, of itself, if it be retained by the plant in Britain, would render it especially valuable to that country. But this, taken along with its highly nutritious qualities, its vast yield, its easy culture, its great duration, its capability of flourishing on land of the most inferior quality and wholly inadapted to tillage, impart to it a general character of probable utility unrivalled in the history of agricultural productions. When once in possession of the ground, for which the preparation is easy, it requires no subsequent ploughing, weeding, manuring, or other operation, save that of cutting and of converting the foliage into hay. Of its duration he relates that its seeds, having been carried westward along with those of yellow lucerne, above 40 years ago, and sown on the eastern frontier of Cashmere, vegetated, and that the plants of the first growth still remain in a flourishing condition. He conceived that by the cultivation of this plant, moors and wastes hitherto uncultivated may be made to produce large quantities of winter fodder, and that the yield of high lands and downs enjoying a considerable depth of soil may be trebled. Dr. Falconer, in his visit to Cashmere and Tibet, found it in the latter, as well as on a low trap hill in the former, but not so vigorous in the Cashmerian as in its Tibetan habitat. He states that though abundant in various directions, the Cashmerians do not esteem it of any value. Arrian, in describing Alexander's expedition across the mountains which he calls Caucasus and Paropamisus (iii. 28), says, nothing but *Silphium* and the Turpentine-Tree grow there, notwithstanding which it is very populous, and multitudes of sheep and neat cattle are seen, for they feed upon *Silphium*, of which the sheep especially are very fond. This bears so close a resemblance to the *Prangos*, both in locality and properties, that it is as likely to have been the *Silphium* of the ancients, as the assafœtida plant.

which it is supposed to be by others.—*Eng. Cyc.*

(6563) PRANGOSI PABULARIA. Vern. Fiturasulioon, north of India, near Draz. This plant constitutes excellent fodder for cattle, fattens quickly, and destroys the "liver fluke" of sheep. Mr. Royle considers this one of the plants which yielded the Silphium of Alexander's historians.—*O'Shaughnessy page* 369. The celebrated Prangos Hay plant Grass was discovered by Mr. Moorcroft, in Tibet, and found by him to be employed as winter fodder for sheep and goats, and frequently for neat cattle. Mr. M., writing from the neighbourhood of Droz, describes the Prangos Hay plant as producing fatness in a space of time singularly short, and likewise as being destructive to the River Fluke; he therefore justly concluded that it would be an invaluable acquistion to any country to the climate of which it was suited, as its highly nutritious qualities, its vast yield, its easy culture, its great duration, its capability of flourishing on lands of the most inferior quality and wholly unadapted to tillage, impart to it a general character of probable utility unrivalled in the history of agricultural productions. When once in the possession of the ground, for which the preparation is easy, it requires no subsequent ploughing, weeding, manuring, or other operation, save that of cutting and of converting the foliage into hay."—(*Moorcroft* in a letter to W. Butterworth Bayley, Esq, formerly Chairman of the Court of Directors.) Various attempts have been made to introduce the Prangos Hay plant into Great Britain, but hitherto unsuccessfully; and it is probable it will only succeed, and be valuable in a climate similar to that where it is found indigenous. The Prangos is highly valued in the cold and arid region of Tibet, where it is indigenous, and which Mr. Moorcroft (v. p. 179) thought would be valuable as fodder for sheep and cattle in European countries. It is found in Tibet, and also most abundantly on Ahatoong, a low trap hill in the valley of Cashmere; but there it was not so vigorous as in its Tibetan habitat. Though abundant in various directions, the Cashmerians do not esteem it of any value, and Dr. Falconer is of opinion that its importance has been much over-estimated, in consequence of its being the only food in many of the bleak and barren tracts of Tibet. In Cashmere, where far from a deficiency of herbage there is actually a superabundance of pasture grasses, it is necessarily much less esteemed. The Prangos will, therefore, most probably be a valuable acquisition only in countries devoid of good natural pasturage and of which the climate is favourable to its growth.—*Royle, Pro. Res.*

(6564) PRAWN.

Eeral, Tam.	Roiellco Tel.
Jeengha, Duk.	Oodang, Malay.

Ains. Mat. Med. p. 155.

(6565) PREMNA, a genus of Plants of the natural family of *Verbenaceæ*, which is characterised by a cup-shaped calyx, a 5-cleft bilabiate corolla. Stamens 4, didynamous. Drupe pea-shaped, with a 4-celled nut. The species consist of shrubs and small trees, which are indigenous in Asia and Australia, having opposite leaves, inflorescence in terminal cymes, with small flowers. The majority of the species are remarkable for the fetid odour of their leaves; though those of *P. cordifolia* are somewhat fragrant, and those of *P. esculenta* are employed as diet by the natives of Chittagong, *P. integrifolia* has roots of a burning taste, with leaves of a hircine odour. The leaves, applied to the head, are said to cure headache, and a decoction of the roots is employed as a stimulant in fevers flatulence, &c. *P. latifolia* has wood of a white colour and firm texture, employed for variou economical purposes, in which it agrees in character with the teak trees, *Gmelina arborea*, and others which belong to the same natural family —*Eng. Cyclopædia.* Of this genus, Dr. Wight in Icones, gives *Cordifolia*, 1483; glaberrima 1484; integrifolia, 1469; latifolia, 869; serratifolia, 1469; thyrsoidea, 1485; tomentosa, 1468 Wightiana, 1485.

(6566) PREMNA INTEGRIFOLIA. Lin Verbenaceæ, Icon. 1469.

Moonnay marum, Tam.

The greens.

Moonee Keeray, also Passoo-munnæ-keera, Tam.	Ghebboonelli Koora, Tel. Ugnie munda, Sans.

The Root.

Ghebboonelli vayroo, Tel.	Moonnei vayr, Tam. Ugniemanda, Sans.

A common but usually small tree, so that th timber is only useful for common purposes.—*Wight.* The leaves of this tree have a ver unpleasant odour when pressed in the hand used by the natives in soups and curry.—*Jaffrey* Root warm and bitterish, given in decoction a a cordial and stomachic: decoction of the leave used in colic and flatulence. (*Rheede.*) *O'Shaughnessy, p.* 486. The root has a somewhat warm an bitterish taste, an agreeable smell, and is prescribed, in decoction, as gentle cordial and stomachic in fevers, and on other occasions requirin medicines of this nature.—*Ains. Mat. Med. p.* 90

(6567) PREMNA LATIFOLIA.

Pedda Nelleekurra, Tel.

A native of most parts of the coast of Coromandel though by no means common; grows t be a small tree; flowers during the hot season The wood is firm, white and used for variou economical purposes, the leaves have a prett strong though not disagreeable smell, and ar much used in curries by the natives.—*Rohd M. S. S.*

(6568) **PREMNA SERRATIFOLIA.**

Munnæ-keeray. Tam.

Leaves used similar to those of P. Integrifolia. The natives are very fond of these two species.—*Jaffrey.*

(6569) **PREMNA TOMENTOSA,** Verbenaceæ, Icon. 1468.

Kolcuttay teak marum, Tam.

A small tree, the wood hard and close grained, f a brownish yellow colour, well fitted for rnamental purposes.—*Wight.* It is a native of he mountainous parts of the Circars.—*Rohde.*

(6570) **PRESENTS IN JAPAN.** There are hree articles which, in Japan, always form part f an Imperial present. These are rice, dried sh and dogs. Some also said that charcoal as always included. Why these should have een selected, or what they particularly symbo-ze, was not learned.—*American Expedition to apan, p.* 429.

(6571) **PRESERVED PROVISIONS,** sup-ly of fresh meat and vegetables is essential not nly to the comfort but even the health. Until ecently this object could only be obtained in the avy by taking on board a large quantity of live ock, the maintenance of which at sea for weeks nd months was not only very expensive but the pply thus procured was constantly lamentably ort of the demand. The result of this defici-cy of fresh provisions frequently displayed it-lf in the prevalence of scurvy and other disor-rs, now happily nearly eradicated, but which ve been computed to have slain more sea-en than ever fell in action. But by the t of preserving supplies, when the earth is vered with snow and when vegetation seems tinct—locked up as it were in the icy grasp of ath,—our tables may be loaded with the oicest vegetable productions of the spring of e summer and of the autumn. When the sal-on, the turbot, the mackerel, the lobster and her dainties of the ocean have become unfit for od or have left our rivers and our shores, a suffi-nt supply would remain ready for use in the nisters in which they are cooked, and which will eserve them for us in full flavour. The free nizens of the air and of the forest will be also our command at all seasons and at periods en the sportsman could not reach them or en otherwise they would be unfit for our con-nption. Both the animal and vegetable king-n would thus be at our command in all periods l seasons to administer to the wants and cap-es of the stomach and to render our kitchens t alone independent of the winds and of the ves and of the mutations of the seasons but n of the laws which regulate the economy Organised Nature. By this art the house-eper may add to his usually limited bill of e many dainties and indulgences not other-se attainable. The invalid also may com-nd at a moment's notice those articles of diet either best suited to his disorder or such as alone are acceptable to his capricious appetite. The process proposed by Mr. Forsyth appears recently to have been put into execution with very considerable success under the patent of M. Masson, Head Gardener to the Horticultural Society of Paris. The gentleman has succeeded in preserving in a very perfect manner various descriptions of vegetables and fruits, the substances thus preserved are dry and shrivelled, contain but little water, and it is evident from their appearance that a very essential part of the process of preservation consists in the abstraction of the water which forms so very considerable a portion of the weight and bulk of nearly all vegetables and fruits. When vegetables thus prepared are immersed in water for some time they swell up become soft and tender and resume to a very great extent the appearance, colour and flavour proper to them in the fresh state. M. Masson has managed to preserve completely spinach, Brussels sprouts, cabbage, beans, peas, sliced carrots, parsnips, potatoes, apples, &c. Having ourselves submitted samples of each of these fruits and vegetables to examination we are in a position to speak from personal knowledge and observation and are enabled to state that the results obtained apparently in so simple a manner are really surprising. In the ordinary mode, the article to be preserved is placed sometimes in the raw state but generally cooked in a tin canister, the lid of which is soldered down but is perforated with a small aperture or pin hole. It is then subjected to the action of either steam, boiling water, or a muriate of lime bath, until the contents of the canister, if not previously dressed, have become about two-thirds cooked. The aperture in the cover is then closed, and the canister and its contents are once more submitted for a shorter period,—that is until the article is completely dressed—to the operation of heat. As soon as it has become cold the canister is covered over with a coating of paint; its preparation is then complete, and it is removed to the proving room. The proving room is simply an apartment the temperature of which has been raised to the degree most favourable to decomposition. If the operation of preservation has been well performed, the top and bottom of the canister, as also, in some cases, the sides, will have fallen in, or have collapsed to some extent: this indicates the exhaustion of the air within, and is regarded by the manufacturer as a tolerably correct proof that the process has been properly conducted. If, however, after some days' exposure in the proving room, the top and bottom of the canister first become flat, and subsequently even convex, it is a certain sign, that the contents have not been well cured, and that they are not in a condition to keep for any length of time. Such canisters have therefore to be either rejected, or else subjected to the same process over again. It should be known that it is not only boiled provisions which may be preserved by the above process, but roasted also, with but a little extra care. The chief articles employed for the preservation of organised substances, are salt, sugar, oil, charcoal, acetic acid, or pyroligneous acid, and alcohol salt is used in the curing of fish of different kinds, bacon, hams &c., in the pickling of pork, and in the corning of beef. Salt possesses great affinity for water which it abstracts largely from the substance to which it is applied and to which affinity its power as a preservative agent is mainly due. Its effect in abstracting water from meat is well seen, in the pickling of pork, in the large amount of fluid termed brine which escapes from the meat. Unfortunately the effect of salt in its application to the preservation of meat is not confined to the removal of water; it hardens the fibre so as to render it tough and indigestible; and at the same time the water, the discharge of which it occasions dissolves out of the meat several of its most important constituents, as the albumen, Kreatine, Kreatinine, lactic acid, and soluble phosphates. Again this salted meat, by the subsequent boiling to which it is subjected, has its nutritive properties still farther impaired, for this extracts much of the gelatine and osmazome, thus at length little else of the meat is left besides the fibre which is so insoluble and comparatively destitute of nourishment. Salt exerts the same effect on vegetable substances as on animal: this is seen in its application to sliced cucumbers and other vegetable. Salt and water, termed "brine," is largely employed by pickle-makers for keeping a reserved stock ready for use, at all times and in all seasons, of the different kinds of vegetables used by them for pickling. The larger makers have some hundreds of hogsheads filled with various vegetables, in some beans, in others, gerkins, &c., thus preserved in salt and water. We have been given to understand that they keep well for months in this way. The salt and water is selected in preference to vinegar on the score of economy. Sugar is principally employed for preserving fruits, either entire or in the state of Jam or marmalade. In the condition of syrup it is semi solid, and operates partly by the barrier which it interposes to the free access of the atmosphere to the surface of the fruit, and partly in consequence of its being a non nitrogenous substance.

The use of oil as a preservative medium is extremely limited; sardines and anchovies are nearly the only articles commonly put up in oil. It appears to operate in the same manner as sugar. The powerful effect of charcoal retarding putrescence in meat and even in restoring tainted meat to a state of sweetness, is well known. Its action is due to its property of absorbing gases and effecting their oxydation as rapidly as they are developed from the decomposing meat and which is made to preserve at least the appearance of freshness. The use of dilute acetic acid or vinegar is confined to the preservation of vegetable substances, and is employed principally by pickle makers. We are not aware that its mode of operation is well understood, it probably acts chiefly by the coagulation of the vegetable albumen which it occasions. Pyroligneous acid, which is an impure kind of acetic acid, possessing a smoky flavour, is applied in two ways to the preservation and curing of such articles as hams and red herrings, either in the fluid state or in that of vapour; in the latter case it proceeds from the wood or turf employed in the drying, and which being continually formed and evolved during the imperfect combustion of the wood or turf gradually penetrates into every part of the meat, imparting the flavour which is so much esteemed. Its action is no doubt the same as that of acetic acid. Alcohol is but little used in the preservation of alimentary substances, although some fruits, as cherries, are often preserved in brandy. For the preservation of anatomical preparations it is the best liquid known. Its action is in part due to its affinity for water.

(6572) *Pemmican.* Pemmican consists of the muscular fibre of beef baked and reduced to a coarse powder. The preparation of the article has been described to us as follows.—The beef trimmed and deprived as far as possible of fat is cut into slices, which are placed on metallic plates, and baked until it becomes dry, hard, and cooked, lastly, the slices are reduced to a coarse and fibrous powder. The articles in this state constitutes what is known as common pemmican. There are, however, other preparations of pemmican: thus a proportion of fatty matter is commonly added with the intention of restoring the fat, of which the meat was necessarily deprived, in order that it might be baked and thus rendering it the better adapted to serve all the purposes of nutrition and respiration. Again, to this mixture of muscular fibre and fat, in some cases sugar is added, and in others, currants. Pemmican is prepared at Gosport in large quantities for the use of the navy, and we believe, is considered to form a valuable and nutritive article of diet. We have been informed that the North Star, which proceeded in search of Sir John Franklin, had a large supply on board. It is used, particularly that with sugar, mixed with the cocoa given for breakfast, and the other kinds with gruel, broth, or soup. Further information in regard to the preparation and use of pemmican will be found we believe, in "Sir John Richardson's Arctic Boat Voyage." Of all the processes used for the preservation of vegetable substances, there appears to be none so satisfactory as that of M. Masson. That fruits preserved in bottles according to the method of Mr. Sadlington lose very considerably in flavour,is unquestionable, yet the process on the whole, yields valuable results. We believe that the most effectual means of preserving fruit is by immersion in syrup ; the expence of this, however,is too great to allow of its use in all cases.—*Food and its adulteration, p.* 428.

(6573) PRESERVES, &c. The Chinese candy many things which are not considered fit for such purposes elsewhere, as millet seeds, bamboo shoots, slices of the lily root, &c., these are hawked about the streets. Ginger root, preserved in sugar, is the most common sweetmeat exported ; it is made of the tender roots of the ginger plant (*Zingiber officinalis*), and when good has a bright appearance, a dark red color, and is somewhat translucent. If the roots are old, the conserve will be stringy, tough and tasteless. Much of this kind of sweetmeat is carried to India for consumption there, and for re-exportation to England and the Continent ; the export to the United States is considerable ; also to Sydney, South America, &c. Other kinds of conserves, as wampee, guava, and pear, jelly, citron, kumquat, oranges &c. &c., are also sent abroad ; the total exportation may be put down at 10,000 boxes, value about $50,000. A box is estimated at 25 catties.

(6574) PRICKLY PEAR, *Opuntia Dillenii*, CACTUS INDICUS. The hedge prickly pear is often seen in gardens, and its large yellow flowers are quite ornamental. The natives of Tenasserim regard it as a species of euphorbia. —*Mason*.

(6575) PRIMULA. THE PRIMROSE. This family of plants includes the Auricula, Polyanthus, and the Primrose They all form in Europe ornamental border flowers ; but will not succeed in S. India.—*Riddell*. Wight gives Primula denticulata, 200.

(6576) PRINCE'S FEATHER, CELOSIA. This is the most elegant plant, when cultivated by the Karens, that I ever saw of the amaranth tribe. It is not the prince's feather of English writers *Amarantus hypochondriacus*, but a species of Celosia which bears a long pendulous drooping panicle or plume like Roxburgh's *C. cernua*, but it is a different species. There are two varieties, one with bright yellow flowers, the other with red.—*Mason*.

(6577) PRINIA (Horsfield), a genus of Birds. It has the following generic character :—Bill rather lengthened, much compressed, entire ; rictus smooth, wings rounded, tail broad and cuneate ; feet large, strong.—*Swainson*.

(6578) PRINIA FAMILIARIS may be taken as an example. It is the Prinya of the Javanese, Familiar Creeper of Latham. It is abundant in many parts of Java, near villages and gardens, in the confines of which, among trees and shrubs, it builds its nest. It is a sprightly bird, sporting among the branches in short and rapid flights, and has received its native name from its lively and pleasant notes.—*Horsfield*.

(6579) PRINSEPIA, a genus of plants of the natural family of *Chrysobalanaceæ*, so named by Dr. Royle in honour of James Prinsep, Secretary of the Asiatic Society of Calcutta. The genus consists of only a single species, remarkable for its thorny appearance, but it may be considered typical of the labours of the individual whom it is designed to commemorate, as, early in the season, it is conspicuous for the abundance of its inflorescence, and, later, for that of the purple-coloured berries with which it is loaded. The seeds are large, and yield by expression an oil which is highly esteemed by the mountaineers of the Himalayas, where it is indigenous, and which by Europeans is thought a good substitute for salad oil.—*Eng. Cyc.*

(6580) PRINSEPIA UTILIS, is a common north-west Himalayan plant, only found at 8 000 feet in Sikkim : it is employed in hedges—*Hooker, Him. Jour. Vol.* II. *page* 291.

(6581) PRIONODON, Dr. Horsfield's name for a feline form (*Felis gracilis*, Delundung of the Javanese), and placed by him in a separate section under the name of *Prionodontidæ*, between *Felis* and *Viverra*. ('Zoological Researches in Java.') Mr. Swainson remarks ('Classification of Quadrupeds'), that of the genus *Prionodon*, at present, but one species has been found in Java. As a familiar appellation, expressive, in all probability, of its analogy to the *Sorecidæ*, he terms it the Shrew Cat.

$$\text{Incisors, } \frac{6}{6}\,;\ \text{Canines, } \frac{1\ \ 1}{1\ \ 1}\,;\ \text{Molars, } \frac{5\ \ 5}{6\ \ 6} = 38.$$

(6582) PRIONODON GRACILIS, has the tail elongated, annulated, cylindrical ; body pale flavescent, with four very wide dorsal bands and two narrow anal bands ; two broad lateral striæ, the narrow cervical striæ, the numerous humeral and femoral spots, and the seven caudal rings very deep brown.—*Horsfield*.

Dr. Horsfield discovered this animal in 1806, during the early period of his researches in the district of Blambangan, situated at the extremity of Java ; the natives distinguish it by the name above given. Dr. Horsfield was not able to ascertain that it is found in any other part of the island, or that it has another name ; but he states that even in Blambangan it is rarely met with. He notices it as inhabiting the extensive forests which, with the exception of the capital of Banyuwangi and a few small villages, cover that district. He obtained but little information as to its habits and manners, and records nothing on the subject beyond what we have mentioned.—*Eng. Cyc.*

(6583) PROCELLARIDÆ, a family of Oceanic Birds belonging to the order *Natatores*.

They are well known to the seamen when far from land, and with which his superstition was once more busy than it is now; but even at the present day they are not unfrequently regarded as ominous, and many a hard-a-weather old quarter-master still looks upon 'Mother Carey's Chickens' as the harbingers of a storm. Though zoologists have differed as to the genera to be included in this extraordinary group, they have been pretty well agreed as to the forms which should be congregated in it. The genus *Procellaria* of Linnæus was formed by that great zoologist for the Petrels, and it is closely followed by his genus *Diomedea* (Albatrosses), between which and the Petrels there are many points of resemblance both in their structure and their pelagic habits. [Dromedeinæ; Laridæ.] Prince Bonaparte ('Geographical and Comparative List,' 1838) makes the *Procellaridæ* the thirty-fourth family of the birds, and places them between the *Laridæ* and the *Colymbidæ*. It includes the genera *Diomedea*, *Procellaria*, *Puffinus*, and *Thalassidroma*. Mr. G. R. Gray ('List of the Genera of Birds,' 1854) makes the *Diomedeinæ* the first sub-family of the *Laridæ*. This sub-family comprehends the genera *Pelecanoides*, *Puffinus*, *Daption*, *Thalassidroma*, *Wagellus*. *Procellaria*, *Diomedea*, and *Prion*. M. Temminck, in his 'Manual' (2nd part, 1820), arranges all the Petrels under the generic name *Procellaria*, Linn., but divides them into the following sections:—

1. Petrels properly so-called, *P. glacialis*.
2. *P. Puffinus*, *P. Anglorum*, and *P. obscura*.
3. Swallow-like Petrels (Petrels Hirondelles), *P. Pelagica*, and *P. Leachii*.

(6584) *Daption.*—*D. Capensis*, Stephens; *Procellaria Capensis*, Linn.; Cape Pigeon of the English; Peintada of the Portuguese, may be taken as an example of this form. Its plumage is variegated with brown and white. The total length of one measured by M. Lesson was 13 inches, that of the tube of the nostrils 6 lines. The testicles were rather deep-gray, the larynx had two muscles proper to it, and the total length of the intestinal tube was 47 inches. M. Garnot communicated to M. Lesson a species which the latter believed to be new, with an elaborate description and anatomical details, which M. Lesson quotes at length.

(6585) ***Prion.*** The type of this genus is the Blue Petrel (*procellaria vittata* and *P. cærulea*, Gmelin) discovered by Forster. Many individuals were taken during the voyage of the 'Coquille,' in 58° S. lat. The following is from M. Garnot's description of an individual of this species, which, in the form of its bill at least, appears to be leading the way towards the Lamellibranchiate Palmipedes. It is distinguished from the other Petrels by the disposition of its bill. The mandibles are hooked at their extremity; their base is very much widened. The edges of the upper mandible are directed a little outwards; they present within a projecting border striated transversely; the interval which separates them exhibits a small groove. The tongue is very thick and the mouth very dilatable. Total length, from the bill to the extremity of the tail, 11 inches (French). Length of the nasal tube 3 lines. Extent of wings 20 inches. Size a third larger than *Thalassidroma pelagica*; upper part of the body ashy-blue or gray-blue, deepest on the head and on the wings. A blackish band cuts across the wings and the lower part of the back near the origin of the tail. This portion is deepest in colour; the extremity of the tail has the same blackish deep-blue tint; lower part of the body and wings white; above the tail a line of a blue tint; bill and eyes plumbeous blue; middle of the upper mandible and tube of the nostrils blackish. The middle tail-feathers are rather the longest, which gives the tail a rounded appearance. The same author gives an interesting detail of the anatomy of the bird. —*Eng. Cyc.*

(6586) PROSOPIS SPICIGERA.

Vannimarum Pullum, Tam. | Tshamie pundoo, Tel.

Parumbay marum, *Tam.* A thorny tree, not uncommon in the black cotton soils, attaining a large size in Mysore. Wood strong, hard, straight grained, and easily worked. The foliage of the tree and the character of the wood, closely resembles that of its congener *Acacia sundra.* Wight No. 84. This tree attains a considerable size and the timber is strong and hard, used for bandy wheels and other common purposes. A specimen of this wood supported 592 lbs. Is it the same as the vunny marum? The botanical specimens which accompany both belonged to Prosopis spicigera. The specimens brought to Dr. Wight under this name were not in flower, but seem quite identical with those of the purrembay; this therefore is, he believes, the Tamool, the other the Mallayalum name. The wood, if I have not mistaken the species, is very strong, sustaining nearly 600 lbs; is hard, straight-grained and easily worked, but it may be another name for currengally, the foliage of which is very like that of Prosopis spicigera—*Wight.* This pod is about an inch in circumference and from six to twelve long. When ripe it contains a quantity of a mealy substance which has a sweetish taste, and is eaten by the natives.—*Ainslie*, *p.* 334.

(6587) PROSOPIS SPICIGERA? Mimoseæ, Roxb. c. 63.

Punambay wood, Eng. | Panumbia marum or Vunny marum. Tam.

(6588) PROTEA. Proteaceæ. These plants are natives of the Cape, and would be found difficult to cultivate from their fleshy roots; the soil best suited for their growth is light loam mixed with sand, they require great attention as they suffer either from a want or excess of water. —*Riddell.*

(6589) PROTIUM CAUDATUM. TEREBINTHACEÆ.

Malay Kloovy, TAM.

A moderate sized tree; the wood as shown by the branches is very brittle and full of sap, apparently of no value.—*Wight.*

(6590) PRUNELLAS.

Aloo Bokhara, GUZ. HIND. PERS.

Have a reddish-yellow colour, and a sweet grateful taste, with a slight and pleasant acidity. They are a variety of prunes, and are brought to Bombay from the Persian Gulf.—*Faulkner.*

(6591) PRUNES.

Aloo Bokhara, GUZ. HIND. PERS.

A species of dried plum, of which there are many varieties. They are generally of an oblong shape, and sweet taste, and are prepared in France, Germany, Portugal, and other parts of the Continent. Those procurable in Bombay, are brought from the Persian Gulf.—*Eng. Cyc.*

(6592) PRUNUS, a genus of Arborescent Rosaceous Plants, belongs to the Amygdaleous division of the order, and comprehends several of our domestic fruits. The Cherry, Bird-Cherry, Plum, Damson, Sloe, Bullace, and Apricot, are all comprehended in the genus as limited by Linnæus; but in the opinion of some modern botanists, the true Plums require to be separated from the others, and should exclusively constitute the genus *Prunus*, while the others are to be considered as belonging to two other genera, represented by the Cherry and the Apricot. In this view of the subject, each genus is characterised thus:—

(6593) *Armeniaca*, the Apricot.—Drupe woolly outside. Stone blunt at one end, sharp pointed at the other, with a furrow passing all round it, and an even surface. Young leaves rolled up.

(6594) *Cerasus*, the Cherry.—Drupe smooth, without bloom. Stones roundish, smooth. Young leaves folded flat.

(6595) *Prunus*, the Plum.—Drupe smooth, covered with bloom. Stone sharp-pointed at each end, furrowed all round, and smooth on the surface. Young leaves rolled up. Of the Plum genus, thus restricted, there is in common use the Garden Plum (*P. domestica*), with all its numerous varieties, the Bullace (*P. insititia*), and the Sloe (*P. spinosa*). These plants are distinguished specifically by botanists, but apparently without reason. It is the opinion of the best experimental physiologists, that the Sloe of our hedges was the origin of the others; and certainly there is not more difference between a Sloe and a Greengage than there is between a German Quetsche and an English White Magnum-Bonum. Several other species belong to the genus, but they are of no moment, with the exception of a plant called *Prunus coccomilia*, which inhabits the mountains of Calabria, and has a great reputation in Italy on account of the tonic qualities of its bark.—*Eng. Cyc.*

(6596) PRUNUS ARMENIACA. AMYGDALINEÆ.

Zard-alu, HIND.

The Apricot. This tree grows to a large size in gardens of the Deccan. It blossoms at the same season as the peach, from January to March; the fruit forms and attains the size of a common marble, after which it falls off, and this no care can prevent. Many efforts have been made to get buds to take both on the peach and almond stocks but without success, attempts to graft it by approach have hitherto been unsuccessful: the tree grows well on the first range of the Himalayas, bearing abundance of fruit in the months of May and June. Propagated in the same way as the peach.—*Riddell.*

(6597) PRUNUS CERASUS.

Padam. HIND.

The Cherry. This tree is not found in any part of the Deccan; but abounds wild in the hills north of Deyrah Dhoon, producing a small common black fruit fit only for preserves, &c.—*Riddell.*

(6598) PRUSSIAN BLUE, BLUE PRUSSIATE OF IRON, FERRI FERROCYANIS, FERRO-PRUSSIATE OF IRON, PERCYANIDE OF IRON, SESQUI-FERROCYANIDE OF IRON.

Bleude Prusse, FR.
Berlinerblau, GER.
Azurro Prussiano, IT.
Lasor Bexlinskaja, RUS.
Azul de Prussia, SP.

A pigment or dye, composed of cyanogen and iron, and procured by a chemical process from carbonate of Potass, bullock's blood, green vitriol, and alum. It is prepared of different degrees of purity, and additions are made to it according to the purposes for which it is required. When pure, it is of a rich and intense blue, with a copper tint on the surface, inodorous, tasteless, insoluble in water, in alcohol and diluted acids; but is acted upon and dissolved by strong acids. Prussian blue is now extensively made in China, the art of manufacturing it having been carried from the West to the East by a Chinese sailor. —*Waterston—Faulkner.*

(6599) PRUSSIC ACID. HYDROCYANIC ACID. Is obtained by the action of muriatic acid on bi-cyanuret of mercury. It is limpid, very volatile, and of a strong pungent odour, resembling that of bitter almonds. Its taste is acrid, and it is virulently poisonous. In medicine it is used as a sedative.—*Waterston.—Faulkner.*

(6600) PSIDIUM, (from ψίδιον, the Greek name for a pomegranate), a genus of Plants belonging to the natural order *Myrtaceæ*. The tube of the calyx is ellipsoid or obovate, usually contracted at the apex; the limb ovate, undivided, but afterwards from 1- to 5-cleft. There are five petals and numerous free stamens inserted in a broad circle, almost through the whole undivided part of the limb; the style is filiform, the stigma capitate; the ovules are numerous, horizontal, and fixed to the margin of the placenta; the berry is many-seeded, corticate by the tube of the calyx, and crowned by its lobes. The seeds imbedded in the pulp in the mature fruit with a bony testa. The species are trees or shrubs, natives of America within the tropics The fruit is edible, and is known by the name of Guava. It has a fragrant but peculiar odour and very sapid taste, and is eaten both raw and when made into jelly.—*Eng. Cyc*

(6601) PSIDIUM POMIFERUM, Apple-Bearing or Common Red Guava, has tetragonal branches, oval or oblong lanceolate leaves, pubescent beneath, from 3 to 8 peduncles, or many-flowered. The fruit is globose, yellow, and somewhat astringent, with an agreeable odour; the root and young are astringent; and are esteemed strengthening to the stomach. It is a native of the West Indies, Mexico, and South America.—*Eng. Cyc.*

(6602) PSIDIUM PYRIFERUM. White Guava.

Soopari am or Soopium Hind.
Pevara, Beng.
Jam, Duk.

The Wood.

Guava wood, Eng.
Coava marum, Tam.
Jama kurra, Tel.
Sebe mara, Can.

The guava tree is planted in Tenasserim perhaps more extensively than any other fruit tree in the country. Loudon has the most correct notion of the fruit. He says: "Most of the species are cultivated in the tropics for their fruit, which also ripens freely in this country, but is of little merit." The white guava is the species most usually cultivated but the red is not uncommon.—*Mason*. Besides yielding fruit, the wood is useful for many purposes as handles of tools, mallets, pegs, &c., it is very hard.—*Rhode. M S.S.*

The Fruit.

Coia pallum, Tam.
Jamb, Duk.
Goia pundoo Tel.
Pera coy, Mal.
Guava, Eng.
Utchola, Sans.

This Indian fruit is generally preferred fresh from the tree in the morning early; as the heat of the day is supposed to injure its flavor. —*Ainslie, p.* 223. It grows in all parts of the Deccan. The fruit is both red and white, pear shaped and round: it is esteemed as a dessert fruit, but the scent when too ripe is unpleasantly powerful; it makes a most excellent jelly, and also is prepared in a similar manner to damson cheese at home. The fruit sometimes is as large as a common baking pear, and one weighed half a pound. - They have been brought to great perfection in some gardens, and the fruit of a large size divested almost of seed: this sort generally has a very rough knotty coat, and is more spongy and less firm than the other varieties. As plants continually grown from layers in time cease to produce seed, perhaps this variety has been so procured. It is easily increased by seed, and only requires a good soil to thrive in. The trees should be pruned once a year, otherwise the branches become very straggling. Good gunstocks are made from the old wood.—*Riddell.* In all Southern Asia the common Guava is found every where in gardens, which probably found its way to India from S. America through the Portuguese, Wood small, but very hard, and is used by Dr. Hunter for wood engraving, and commonly for pegs, mallets, handles of tools, &c.—*M E. J R.*

(6603) PSITTACIDÆ, an extensive and highly-interesting family of Birds, including those commonly called Parrots. They are remarkable for their beautiful colours, their powerful bill, their fleshy tongue, and their power of imitating the human voice. The articulation of some of the species is so perfect, that when the bird is unseen it is difficult to suppose that the words pronounced do not proceed from the mouth of man

Mr. Swainson is of opinion that the Parrots constitute the subtypical division of the *Scansores* wherein the powers of climbing are less developed. "If," says Mr. Swainson, "any group in nature be isolated, it is this. Possessing in themselves the strongest characteristics, there is no bird yet discovered which presents any point of connection to them: approximations indeed are certainly made towards them by the tooth-billed Barbuts (Barbets, *Pogonias*); but there is still a gap, which no genus yet discovered is calculated to fill up. On considering the relative difference between the Barbuts and the Parrots, we should say, theoretically, that of all the five groups among the latter, one only remains to give the typical structure." As the Parrots appear to Mr. Swainson to form a group precisely equivalent to the true Woodpeckers, he arranges them under five genera: the Maccaws, the Parrots, the Cockatoos, the Lories, and the Ground Lories (*Platycercus*, Vig.) In the synopsis at at the end of the work ('Classification of Birds') we find the following arrangement:—

Psittacidæ.

Bill very short: the upper mandible greatly curved over the lower, which is considerably shorter.

Sub-Family *Macrocercinæ*. Maccaws.

Upper mandible greatly hooked; lower mandible much higher than broad. Tail very long, cuneated.

Genera: *Macrocercus*, Vieill.; *Conurus*, Kuhl; *Leptorhynchus*, Sw.; *Palæornis*, Vig.

Sub-Family *Psittacinæ*. Parrots.

Upper mandible very distinctly toothed; lower mandible longer than it is high. Tail short, even, or rounded.

Genera: *Erythrostomus*, Sw.; *Chrysotis*, Sw. (Amazonian Parrots); *Psittacus* (Parrot of the Old World—most typical of this sub-family); *Agapornis*, Selby; *Poicephalus*, Sw.

Sub-Family *Plyctolophinæ*. Cockatoos.

Head large, ornamented with a folding or procumbent crest. Bill short, very broad; the culmen remarkably curved. Tail rounded, lengthened, broad; the feathers not narrowed.

Genera: *Plyctolophus* Vieill. (subtypical); *Licmetis*, Wagl.; *Microglossus*, Geoff.; *Centrourus*, Sw.

Sub-Family *Lorianæ*. Lories.

Bill but slightly curved; the margin of the upper mandible sinuated; the notch obsolete; lower mandible slender, conic, much longer than high; the gonys (typically) straight.

Genera: *Brotogeris*, Vig.; *Psittaculus*, Kuhl; *Trichoglossus*, Vig.; *Lorius*, Brisson; *Pyrrhodes*, Sw.

Sub-Family *Platycercinæ*. Lories.

Tail long, very broad, considerably cuneated. Bill strong, thick, toothed; the culmen very convex. Under mandible deep, but very short: the gonys curved. Feet and toes slender. Tarsus longer than the hallux.

Genera: *Vigorsia*, Sw.; *Platycercus*, Horsf. and Vig.; *Nanodes*, Horsf. and Vig.; *Leptolophus*, Sw.; *Pezoporus*, Ill. (Swainson.)

The family is placed by Mr. Swainson between the *Rhamphastidæ* and the *Picidæ*.

Mr. G. R. Gray ('List of the Genera of Birds') also arranges the *Psittacidæ* between the *Ramphastidæ* and the *Picidæ*.

The sub-family *Palæornina*, as it appears in Mr. Vigors and Dr. Horsfield's 'Description of the Australian Birds in the Collection of the Linnæan Society' ('Linns. Trans.,' vol. xv.), consists of the genera *Nanodes*, *Platycercus*, *Pezoporus*, *Palæornis*, and *Trichoglossus*.

(6604) *Palæornis.*—The Parrakeets forming this group belong to continental India and some of the neighbouring islands in the Indian Ocean and Africa, with the exception of *Palæornis Barrabandi* (*Polytelis* of Wagler), which is a native of Australia. India and its islands must however be considered as the principal locality of the species, which, according to Wagler's monograph, amounts to eleven, including *Palæornis nornatus* which he adds to the group with doubt.

The Ring Parrakeets, as they are generally ermed, are justly held in high estimation for the symmetry of their form, the grace and elegance of their movements, the beauty of their colours, their great docility and powers of imitation, and their fond attachment to those with whom they re domesticated and who treat them with kindness. They were not less prized, as we know, by the ancients; and it becomes a not uninteresting inquiry to endeavour to ascertain what were the species known to them. Some suppose that *Palæornis Alexandri* was the only one: but though that species may have been and was probably the first introduced into Europe, we think that it will appear that those who confine the Parrakeets known to the ancients to that bird have taken too narrow a view of the subject.

This genus has the following characters:—Bill rather thick; the upper mandible dilated, the culmen round, the lower mandible broad, short, and emarginate. Wings moderate; three last quills (extimis) nearly equal, longest; external webs of the second, third, and fourth gradually broader in the middle. Tail graduated; the two middle very slender feathers much exceeding the rest in length. Feet with short and weak tarsi; the claws moderate, rather slender, and falcate. Body slender and neat (Vig.)

Mr. Vigors divides the genus into the following sections:—Lower mandible short.

(6605) *P. Alexandri*, *P. torquatus*, *P. flavitorquis*, *P. bitorquatus*, *P. xanthosomus*, *P. Malaccensis*, *P. erythrocephalus*, *P. Bengalensis*, *P. Pondicerianus*, *P. Barrabandi*,

Lower mandible elongated.

(6606) *P. Papuensis.*

(6607) *Lorius.*—The true Lories are remarkable for the elongated and weak form of the bill, and also for a formation of the tongue, similar to that in *Trichoglossus*. [See, col. 476.] They are inhabitants of the islands of the east, and are considered by Mr. Vigors to be the aberrant group of the family. Their colours are of the most rich and mellow description, and the birds are highly prized, not only for their beautiful plumage, but for their lively, active, and affectionate disposition, and their great docility in the articulation of words and even sentences. The genus has the following characters:—Bill elongated, weak. Wings pointed, two first quills longest. Tail moderate, rounded or gradulated; the feathers broad, and hardly narrow at their tips.

(6608) *Lorius Domicella.*—Rich scarlet; upon the upper part of the breast a yellow collar; crown of the head blackish-purple in front, passing into violet-purple behind; upper surface of the wings green, violet blue at the bend and margins, as are the under wing-coverts; thighs externally azure, greenish at the base; bill orange-yellow. Length between 11 and 12 inches. It is a native of the Moluccas and other Eastern islands.—*Eng. Cyc.*

(6609) PSOPHOCARPUS. In this genus the pods are oblong, and have four longitudinal wings; the seeds are roundish. It comprehends the *Dolichos tetragonolobus*, a twining annual, the pods or tuberous roots of which are a common Indian esculent.—*Eng. Cyc.*

(6610) PSOPHOCARPUS TETRAGONOLOBUS, GOA BEANS. A bean commonly cultivated and used as French beans; easily known by its having 4 fringed membranous edges, much used by Europeans, called by the French *Chevaux de Frise*. The plant is indigenous in the Mauritius.—*Jaffrey*. In Tenasserim there is a variety of the Goa bean which produces esculent roots that are eaten like potatoes, and are a very tolerable vegetable. The young pods are also eaten like French beans.—*Mason.*

(6611) PSYCHOTRIA.

Sgau, Burm.

The genus psychotria furnishes a handsome shrub, whose small white flowers throw a delightful fragrance on the path during a morning walk.—*Mason.*

(6612) PTERIS (from πτέρον, a wing), a genus of Plants belonging to the natural order *Filices*. The thecæ arise from the points of veins placed on a nerve-like receptacle running along the edge of the leaf, forming an uninterrupted marginal sorus ; the involucres are continuous with the edge of the leaf, scarious, and opening inwards.—*Eng. Cyc.* The rhizomek of *Pteris esculenta* is used as food in Australia, and that of *Marattia alata* in the Sandwich Islands.—*Simmonds.*

(6613) PTERIS AMPLEXICAULIS, Stipe-Clasping Brake. A large brake is common at Tavoy with pinnate fronds, whose leaflets have two lobes at the base which clasp their stipe.—*Mason.*

(6614) PTERIS AQUILINA, Common Fern, Bracken, or Brakes, is the most abundant of the British species. It has a long tapering rhizoma, creeping, externally black. The leaves are erect, from one to six feet high, repeatedly compound with horizontally spreading divisions, whose ribs are smooth ; the primary leaves are nearly opposite, the lower ones more alternate, pinnatifid segments oblong, obtuse.—*Eng. Cyc.*

(6615) PTERIS GRAMINIFOLIA, Grass Fern. The trunks of forest trees in Tenasserim are often clothed with the green drapery of the grass fern, which grows upon them precisely like bunches of long grass. It belongs to the same genus as the common brake.—*Mason.*

(6616) PTEROCARPUS (from πτέρον, wing, and κάρπος, a fruit, in reference to the pods being girded with a broad wing), a genus of Plants belonging to the natural order *Leguminosæ*. It has a 5-cleft calyx, a corolla with 5 petals, disposed into a papilionaceous form ; 10 monadelphous or diadelphous stamens, an irregular indehiscent legume, somewhat orbicular, surrounded by a wing, woody, and often rugose, in the middle 1-3-celled. The leaves are unequally pinnated. The racemes axillary, or forming terminal panicles. The species are unarmed trees or shrubs.

(6617) PTEROCARPUS. *Species.*

Ausena wood, Tam.

(6618) PTEROCARPUS. *Species.*

Jumbagum marum, Tam.

Common about Nelambore and in Wynnad : a large tree ; wood used for building and fenc gardens ; said to be durable.—*McIvor.*

(6619) PTEROCARPUS. *Species.*

Karoo Vagoo, Tam.

A very common tree on the Western Ghauts ; wood strong, durable, and much used for building.—*McIvor.*

(6620) PTEROCARPUS. *Species.*

Nou or Nagoo marum, Tam.

A very strong and durable wood, common on the lower elevations of the Neilgherries ; an ordinary sized tree.—*McIvor.*

(6621) PTEROCARPUS BILOBUS. Banks

Vayngie wood, Eng. | Vayngie marum, Tam.

This is reckoned by the natives a very useful wood. It is of a reddish colour, and is employed in making doors and windows, and for other common purposes.—*Ains. Mat. Med. p.* 207.

(6622) PTEROCARPUS DALBERGIOIDES.

Padouk, Burm.

This is found chiefly as a large tree about the neighbourhood of Prome and inhabited places to the north of that town, but rarely in the Forests ; wood red, equivalent t mahogany.—*McClelland.* It is a native of th Andaman Islands, where it grows to an immense size, and forms a valuable timber-tree, of which the wood is known as Andaman red wood, from its resemblance to mahogany ; but it is redder, heavier, and coarse grained, though that of the root is finer tha that of the stem. It was introduced by Col. Kyd into the Calcutta botanic garden in 1794, whence it has been spread into the country.—*Eng. Cyc.*

(6623) PTEROCARPUS DRACO. The resin. dragon's blood.

Dumul-ook-wain, Hind.

A native of the American Islands, and especially Guadaloupe. The bark, wood, and leave are remarkably astringent. The dragon's bloo *in mass* of commerce, according to Jacquin, i the produce of this tree. Another sort, and mos likely that sold in Indian Bazars, is produced b the Calamus Draco of the Straits.—*O'Shaughnessy, page* 997. The Dragon's-Blood Pterocarpus, is a tree nearly 30 feet high, with alternate shining leaflets, about 5 on each side and an odd one, rather obtuse, entire, veine smooth, pale green below ; the legumes nearl smooth. The wood of this tree is white an heavy, the bark thick and of a rusty gray colour When first cut it presents no marks of redness but in a little time red drops of juice begin t collect and exude from the wood. If left in th sun for about ten minutes they become hard an clear, and are collected under the name of *Sangui Draconis*, or Dragon's-Blood. This resin formerly constituted an extensive article of commerc from Carthagena, but from its diminished consumption its collection has ceased, and all the dragon's-blood obtained now in the market is the produce of *Calamus Draco.—Eng. Cyc.*

(6624) PTEROCARPUS ERINACEUS, is a tree 40 or 50 feet in height. It has unequally pinnate leaves, smooth above, downy beneath; from 11 to 15 leaflets, alternate, distant on short stalks, ovate, oblong, obtuse, or emarginate, wiry at the edge; lanceolate stipules, solitary or clustered racemes, downy from the old wood below, the young branches much shorter than the leaves. The flowers are yellow, the legumes stipulate, compressed, membranous, velvety, serrated, and undulated, prickly on the centre. When the branches are wounded, a clear bright gum exudes from them, which is one source of the gum kino of commerce, and is mentioned as such by Park. It is a very powerful remedy in obstinate chronic diarrhœas and dysenteries, and n all diseases arising from laxity of tissue. Externally it is applied as a styptic to check hæmorrhages from wounds and ulcers, and to diminish discharges.—*Eng. Cyc.* It is a moderately lofty tree. Moon, in his travels into Africa, mentions a red gum as issuing from ncisions in trees, and which he mistook for Dragon's-blood. Mungo Park discovered that he tree which yielded this substance was alled Pao de Sangue (Blood-tree) by the Portuguese. His specimens were determined y Mr. R. Brown to belong to *Pterocarpus rinaceus*,—a tree which has since been well gured and fully described in the Flore de Seneambie.—*Royle.*

(6625) PTEROCARPUS FLAVUS is the Yelow Sandal-Tree, and is used for dyeing yellow. ts bark is very bitter.—*Eng. Cyc.*

(6626) PTEROCARPUS INDICUS, Wall.

Padouk, Burm.

According to Mr. Mason another Kino gum ree, the Pterocarpus Indicus of Tenasserim, is a majestic ever-green, whose yellow papilionaceous owers clustering amid the bright drooping oliage, scent the air, like the large magnolias, r several hundred yards around. It is propaated by simply planting large branches in the round at the commencement of the rains. There e, however, two species, the red, and the white distinguished by the Burmese—the red producg the finest timber, but the white padouk is by r the finest ornamental tree.—*Mason.* The padouk" is a handsome tree with long waving anches and clusters of yellow flowers, which ent the air. It produces very fine timber, and ay be considered one of our most valuable fort trees. This species also yields Gum Kino. ort. Garden 55, Firth.—*M. E. J. R.*

(6627) PTEROCARPUS MARSUPIUM.

Vangay wood, or Yagesah wood, Eng.
Vangai marum Tam.
Beebla, Hind.
Yegassee kurrah, peeah saloo, Tel.
Whonay. Can.
Vengay, Tam.
Yegis, Tel.
Pedong Burm.
Dhin daga, Can.
Peet Shala, Hind.
Benba, Bia, Beebla, Duk.
Yegah, Beng.

Pterocarpus Marsupium, is a tree with a very high trunk, scarcely ever found straight. The bark has a brown outer coat which is thin and spongy, and falls off in flakes, disclosing the inner bark, which is fibrous, red, and astringent. The branches are numerous, horizontal, and spreading. The leaves sub-bifarious, alternate, pinnate, with an odd one, 8 or 9 inches long. The panicles are terminal and very large, ramifications bifarious. The flowers are very numerous, white, and with a small spot of yellow in the centre. The bracts small, caducous solitary below each division and sub-division of the panicle. The seed is solitary and kidney-shaped. This tree is thought by Roxburgh to be the one yielding Gum Kino, a well known astringent, the juice hardening into a dark red and very brittle gum-resin, which, on being powdered, changes to a light brown, not unlike Peruvian bark. Its taste is strong, but simply astringent. The real kino-tree however appears to be the P. Erinaceus—*Eng. Cyc.* It is common all round the foot of the Ghauts, wood much used in building but exudes a yellow dye, which discolours the chunam where it comes in contact with it.—*Mc. Ivor.*

The *Pterocarpus marsupium* is one of the most lofty and striking trees in the Indian forests —it is well described by Roxburgh, in the *Flora Indica*, Vol. iii. p. 234—and figured in his *Coromandel Plants*, ii. *t.* 116. It is a very large tree, affording excellent shade and timber, the latter is of a dark brown color, and dyes yellow; for building purposes it is almost as good as teak, but cannot be used for lintels of doors, windows, &c. as it discolors the whitewash. It grows luxuriantly on the eastern ghauts, on the hills between Vellore and Salem, and on the Malabar and Canara ghauts, where large quantities of the resinous substance it yields are collected,and sent to England under the name of " kino." The tree abounds not only near Tellicherry, but along the whole Malabar Coast. Dr. Cleghorn has seen it both in the ascent of the Eastern and Western Ghauts. Dr. Wight sent to him specimens from Coimbatore, and Roxburgh found it in the N. Circars. Buchanan Hamilton mentions it under the name of *Vijaya* as occurring in Nepal and also to the eastward of Bengal. The vernacular names are as follows: Beuba, Bia, Beebla, *Duk.*; Whonay, *Can.*; Yegy, Vayga, *Beng.* It has been observed in the Concans, (*Graham.*) Rajpeepla jungles, (*Dr. Lush.*) Assam, (*Voigt.*) It yields from incisions a large quantity of blood-red juice, which on being simply exposed to the sun, hardens and then quickly cracks into little angular masses, and crumbling fragments which constitute, without further preparation, the kino of the shops. Specimens of the exudation sent by Dr. Cleghorn to Professor Christison in 1846 from Mysore, were considered by him "quite identical with the kino of commerce." The tree being thus widely diffused, and the exudation procurable in *large quantity*, it may possibly come into extensive use in *dyeing* and *calico-printing*. The product can be obtained with facility by simply incising the bark and requires no outlay save that of collecting.—*Cleghorn*. Mr. McIvor says, it is common all round the foot of the Ghauts, wood much used in building but exudes a yellow dye which discolors the chunam where it comes in contact with it.—*McIvor, M. E.* It grows to be a very large tree; flowering time, the beginning of the rains, the seed ripens about the close of the year. The timber will be found useful for many purposes: very little inferior to teak, it seems less liable to split after long exposure and is equally strong, but the wood is heavier. Vessels built in the Ganjam Districts are planked with it; and the door pannels and venetians of the neglected houses at Ganjam are formed of this wood and have stood better than teak similarly situated. Very great caution is requisite in using this wood to obtain it sound. It is more expensive than teak to work and when sawn green the outer planks bend considerably, its price on the Godavery is about 3 annas a foot. This is one among the unlucky woods of the natives though the prejudices against it have in part given way to profit. For general utility, it is superior to any other mahajante wood, a commercial term among the people of the Northern Circars including all wood used for building except teak.—*Rhode M.S.S.*

(6628) PTEROCARPUS SANTALINUS. Red Saunders Wood.

Segapoo chendanum, Tam.	Whonnay Can.
Sal Chundend. Duk.	Raeta Chandana, Sans.
Sundel Ahmer, Arab.	Chendana, Tel. Hind. Beng.
Buchum, Pers.	Raet handoon, Cyng.

This is a large, good timber tree, fit for furniture.—*Ains. Met. Med. page* 210. It is a lofty tree having alternate stalked ternate leaves, petiolate alternate leaflets, smooth above, hoary beneath. The racemes are axillary, simple, or branched, and erect. The legume roundish, stalked, falcate upwards, compressed, smooth, keeled on the lower edge, the keel being membranous and undulated. From this tree is obtained the Red Sandal-Wood, a timber chiefly used by dyers and colour manufacturers of the present day, but which is also used to colour several officinal preparations, such as compound tincture of lavender. Its colouring matter forms beautiful coloured precipitates with many metallic solutions.—*Eng. Cyc.* It is a native of Coromandel, being abundant on the Naggery Hills, Ceylon, Timor, and other parts, the wood is exported to Europe in billets, it is very heavy, sinking in water, extremely hard, of a fine grain and bright garnet red colour which brightens on exposure to the air, it is employed to dye lasting reddish brown colours on wool, it yields its colouring matter to ether and alcohol but not to water, its price in bond in England was in 1882, 13£ to 14£ a ton.—*Rohde, M. S. S.* Dr. Wight says the wood of this tree is brought to Coimbatore in small quantities from Mysore, and sold by weight at an extravagant price. Seen under the microscope, the texture is the same, as that of *P. marsupium* the colour only differs. It grows abundantly in the Naggary Hills, yields the "Red Sandal wood" of commerce. It is sold by weight as a dyewood, and forms a regular article of export. It takes a beautiful polish, but the high price of the wood for dyeing purposes, precludes its use as a timber.—*M. E. J. R.* Simmonds tells us that *Red Sanders wood* is hard and of a bright garnet red color, and employed to dye a lasting reddish brown on wool. It only yields its color to ether or alcohol. The tree, which is a lofty one, is common in the Madras Presidency and other parts of India; it is also indigenous to Ceylon, Timor, and other Eastern islands. The exports of this wood from Madras in one year have been nearly 2,000 tons. The imports of red Sanders wood from Calcutta and Bombay chiefly into London are to the extent of 700 or 800 tons a year, worth £6 to £9 per ton.—*Simmonds.* In Ajmere, Red Saunders wood is used chiefly in suffumigations to the native gods; is also used in medicine: it is brought there from Delhie, costs ten rupees per maund.—*Gen. Med Top p.* 131 This colouring drug is little used by the Indian Practitioners, though they sometimes recommend it in powder in conjunction with certain herbs and mixed with Gingilie oil, as an externa application, and purifier of the skin, after bathing The tree grows in abundance in the Bengal provinces on the Malabar coast and also in Mysore where Dr. Buchanan tells us it is called Whonnay and that the bark contains much red coloured juice.—*Ains. Mat. Med. p.* 42.

(6629) PTEROCARPUS WALLICHII, and Pterocarpus dalbergioides. The gum kin tree, pterocarpus, or padouk, produces a timbe which in its finest specimens bears so strong a resemblance to mahogany that a visitor mistook i for mahogany, and recorded it as such in th book of his travels. At Maulmain, it is calle red-wood, and one of the trees, for there are th two above species, differs very slightly from th tree which yields the Andaman red-wood, o which Roxburgh wrote: "Wood not unlike mahogany, but more heavy, red, and coarse in th grain. That of the root beautifully variegated closer grained, and darker coloured."—*Mason.*

(6630) PTEROPLEURA. [GECKOTIDÆ.]

(6631) PTEROPODA, a class of *Mollusca* placed between the *Gasteropoda* and *Brachiopoda* by some writers, and by others next the *Cephalopoda*. The number of species is not large. They pass their entire life in the open sea away from shelter, except that which is afforded by the gulf-weed. In appearance and habits they resemble the fry of the other forms of *Mollusca*. They are supplied with a pair of flippers or wings (hence their name), by means of which they pass rapidly through the water. They swarm in tropical and arctic seas, and are sometimes so numerous as to colour the ocean for leagues. They are the principal food in high latitudes of the species of whale and of sea birds. They are rarely found on the sea-shore, and only one or two species have been accidentally taken in the British seas. "In structure, the *Pteropoda* are most nearly related to the marine univalves, but much inferior to them. Their nervous ganglia are concentrated into a mass below the œsophagus; they have auditory vesicles, containing oolites; and are sensible of light and heat and probably of odours, although at most they possess very imperfect eyes and tentacles. The true foot is small or obsolete; in *Cleodora* it is combined with the fins, but in *Clio* it is sufficiently distinct, and consists of two elements; in *Spiralis* the posterior portion of the foot supports an operculum. The fins are developed from the sides of the mouth or neck, and are the equivalents of the side-lappets (*Epipodia*) of the sea-snails. The mouth of *Pneumodermon* is furnished with two tentacles supporting minature suckers; these organs have been compared with the dorsal arms of the cuttle-fishes, but it is doubtful whether their nature is the same. A more certain point of resemblance is the ventral flexure of the alimentary canal, which terminates on the under surface, near the right side of the neck. The pteropods have a muscular gizzard, armed with gastric teeth; a liver, a pyloric cœcum, and a contractile renal organ opening into the cavity of the mantle. The heart consists of an auricle and a ventricle, and is essentially opistho-branchiate, although sometimes affected by the general flexure of the body. The venous system is extremely incomplete. The respiratory organ, which is little more than a ciliated surface, is either situated at the extremity of the body and unprotected by a mantle, or included in a branchial chamber with an opening in front. The shell, when present, is symmetrical, glassy, and translucent, consisting of a dorsal and a ventral plate united, with an anterior opening for the head, lateral slits for long filiform processes of the mantle, and terminated behind in one or three points; in other cases it is conical, or spirally coiled and closed by a spiral operculum. The sexes are united, and the orifices situated on the right side of the neck. According to Vogt, the embryo Pteropod has deciduous vela, like the sea-snails, before the proper locomotive organs are developed.—*Huxley*.

"From this it would appear that while the *Pteropoda* present some analogical resemblances to the *Cephalopoda*, and permanently represent the larval stage of the sea-snails, they are developed on a type sufficiently peculiar to entitle them to rank as a distinct group; not indeed of equal value with the *Gasteropoda*, but with one of its orders.

"This group, the lowest of the univalve or encephalous orders, makes no approach towards the bivalves or acephala." (Woodward, 'Treatise on Shells.')

De Blainville divides this group into two sections, *Thecosomata* and *Gymnosomata*:—

A. Thecosomata.—Animal furnished with an external shell; head indistinct; foot and tentacles rudimentary, combined with the fins; mouth situated in a cavity formed by the union of the locomotive organs; respiratory organ contained within a mantle cavity. This section embraces two families, *Hyadæidæ* and *Limacinidæ*. *B. Gymnosomata.*—Animal naked, without mantle or shell; head distinct; fins attached to the sides of the neck; gills indistinct.—*Eng. Cyc.*

(6632) PTEROSPERMUM (from the Greek word πτερόν, signifying a wing, and σπέρμα a seed), a small genus of Plants belonging to the natural order *Byttneriaceæ*, which is found in the Indian Isles and the southern parts of India. The flowers being large and the foliage showy, have induced the cultivation of the species as ornamental trees all over India. The calyx is leathery, 5-partite, tomentose outside, hairy within; petals 5, shorter than the calyx; stamens 20 (5 sterile), united at the base into a column with the stalk of the ovary; style slender, club-shaped; seeds winged. The genus is small, but all the species form handsome trees, and, like most of the plants of the nearly allied order of *Malvaceæ*, abound in mucilage.—*Eng. Cyc.*

(6633) PTEROSPERMUM ACEROIDES,

Thamajamwai-zeke, BURM.

(6634) PTEROCARPUS SUBACERIFOLIUM.

Najee, BURM.

(6635) PTEROCARPUS ACERIFOLIUM.

Najee. BURM.

These three species of large timber are found growing along with Teak in all the Pegu Forests. The two first are plentiful, but the third kind is scarce. This timber is extremely valuable and is as strong as either Teak or Oak. Its durability for purposes of ship-building has never been tested, because it has never been desicated or killed like the Teak. It attains a girth of ten or twelve feet and rises to a lofty height: It has a dark-brown wood.—*McClelland.*

(6636) PTEROSPERMUM HEJNIE, LOLOOGA WOOD.

Lolooga kurra, TEL.

(6637) PTEROSPERMUM INDICUM, KYANOOCA. This wood is obtained from the knotty excrescences or burrs of Pterospermum Indicum? it is sawn off in slabs—2 to 4 feet long and 2 to 8 inches thick. It resembles the hue of the yew is very hard and full of curls—the colour being reddish brown, varying to orange. It is very ornamental, and much esteemed in China, India and England, where it is used for making small boxes, writing desks and other fancy ornamental work. The wood is brought to Singapore by Eastern traders, and is sold by weight.—*M. E. J. R.*

(6638) PTEROSPERMUM SUBERIFLORUM.

Taddee Marum, TAM.

A native of the mountainous tracts all over India. Flowering time the beginning of the hot season. Trunk erect, growing to be a timber tree of middling size. The wood is white and too soft to be of much use.—*Rhode M.S.S.*

(6639) PTYCHOTIS, a small genus of Umbelliferous Plants, of which the seeds of some of the species have formed articles of condiment and of medicine from very early times. The genus extends from the south of Europe, through the Oriental region, to all parts of India. The calyx is 5-toothed; petals obovate, bifid, or emarginate, with a long inflexed point. Fruit compressed laterally, ovate or oblong. Seed roundish or flat before and convex posteriorly. The species are annual or biennial plants. Stem-leaves usually cut into numerous capillary segments. Flowers white, disposed in compound umbels, of which the involucels are many-leaved, and the involucre either wanting or few-leaved. The European species are not remarkable for any useful properties, the *P. copticum* and *P. Ajowan* probably yielded the seeds which formed the 'Ammi' of the ancients. Botanists and inquirers into the plants, condiments, and medicines of the ancients, have usually sought too exclusively in Europe for what was frequently derived from the East. Dioscorides states that the Æthiopic Ammi is called Cumin by some, and that it is thought to be distinct from the royal kind. The seeds of one kind were sent by Forskal to Linnæus, who named the plant *Ammi copticum*. This has now been removed to the present genus *Ptychotis*. Arabian authors give Nankhwah as the synonym of Ammi, and Persian authors consider Ajwain to be a synonym of the former. It is remarkable, according to Dr. Royle, that there is also an Indian plant which is everywhere called Ajwain, and celebrated for its aromatic smell, pungent taste, and for its employment both by natives and Europeans for culinary and medicinal purposes; so much so, that Dr. Roxburgh could not conceive that "this famous Indian plant should be unknown to European botanists." Dr. Royle says, "in Persian works in use in India the Arabic Nankhwah is given as a synonym of the Indian Ajwain, as it is also of the Greek Ammi." The Indian species has been referred by De Candolle to the genus *Ptychotis*, and called by him *P. Ajwan*, stating that it was very closely allied to *P. coptica.* which we have seen was considered to be one kind of Ammi—the two kinds described by Dioscorides being *Cuminum Æthiopicum* and *C regium.* The latter name is translated by the Persians 'Kamoon Mullooke,' or Royal Cumin, and given as a synonym of the Nankhwah. The Indian and Egyptian kinds of *Ptychotis*, as ascertained by modern botanists, are therefore most probably the two kinds of Ammi of Dioscorides. These afford interesting instances of the results to be obtained by closely examining the products of nature possessed of any remarkable properties, in the countries where they are produced, and continue to be used, and whence they were probably first obtained by the ancients. *Eng. Cyc.*

(6640) PTYCHOTIS AJOWAIN, *Roxb. Fl. Ind. ii.* 91. *Syn.* Ligusticum Ajwain, (Fleming. As. Res. xi. p. 170). Sison Ammi, of *Ainslie.*

Ajouain, Juvance, BENG. and HIND.
Nankhah, PERS
Amoos, ARAB.

Cultivated in India every where. This is one of the most useful of the Umbelliferæ, and an excellent remedy in flatulant colic; much used in India. (*Roxb.*)—*O'Shaughnessy, p.* 357-58.

(6641) PTYCHOTIS COPTICA. (Coptic ammi) Egypt and Candia. Used as a stimulant aromatic.—*O'Shaughnessy, page* 357.

(6642) PTYCHOTIS INVOLUCRATA. *Anceson* of North India, *Chanoo* and *Radhooni* of Bengal, used as a substitute for parsley. *Royle.—O'Shaughnessy, page* 358.

(6643) PTYCHOTIS SYLVESTRIS, Arab Ajwain, *Royle*, found in the Khadir lands of the Saharunpore district. Used as a stomachic, aromatic, and remedy in flatulence.—*O'Shaughnessy, page* 358.

(6944) PULICARIA, a genus of Plants belonging to the natural order *Asteraceæ*. It has an involucre laxly imbricated in few rows. The pappus in two rows, the outer one short, cup-like, membranous, and toothed, the inner one pilose.—*Eng. Cyc.*

(6645) PUNICA, a genus of Plants belonging to the natural order *Myrtaceæ*, sometimes distinguished, in consequence of its having two verticels of capsules developed instead of one, from *Myrtaceæ* under the name of *Granataceæ*. The genus consists of only a single species, the celebrated Pomegranate, with a dwarf variety which is sometimes considered a distinct species. The pomegranate has from the earliest period formed an object of attraction in the countries from Syria to the north of India, where it grows in perfection, as well as in the north of Africa; and this, as well from its shining dark-green foliage, as from its conspicuous flowers, of which the flower-cup and petals are both of a crimson colour, while its large red-coloured fruit, filled with juicy pleasant-flavoured pulp, which covers its numerous seeds, makes it an object of desire in hot countries. Thus we find it mentioned in the Bible under the name Rimmon (Numbers, ch. xiii.), and we hence learn that it was cultivated in Egypt and also in Palestine; by the Arab authors it is called Rooman, and by the Persians Anar, and it is probably indigenous all along the mountains from the Caucasus to the Himalayas, where it is described by Dr. Royle as being found in a wild state. Forster describes the Pomegranate as being delicious in most parts of Persia; and Burnes states that the famous Pomegranates without seeds are grown in gardens under the snowy hills near the Cabul River. The Pomegranate was well known to the Greeks, being the Ροά of Theophrastus and the Ροιά of Dioscorides. Hippocrates mentions it by what is supposed to be its Phœnician name, Side. By the Romans it was called *Punica*, and *Punicum Malum*, from having been introduced from Carthage. Besides the fruit, the parts employed by the ancients were the double flowers, which were called balaustion, the pericarp, from its leatherly consistence, called malicorium, was used for its astringent properties; while the bark of the root was considered an efficient anthelmintic. In the East, where so much has remained stationary, the different parts continue to be employed for the same purposes; and Dr. Royle mentions that in India puloositon is given as the Greek name of the double flower. The rind of the wild fruit is much preferred for astringent purposes, and forms in the present day an article of commerce from the Himalayas to the plains of India. The bark of the root, being also still employed in India for the expulsion of intestinal worms, was made known as a recent discovery in India, in consequence of a Mohammedan practitioner having cured a European gentleman there of tape-worm with great ease. He had no doubt learned this property of the bark of the pomegranate from the translations of Dioscorides which are incorporated in most of the Mohammedan works on Materia Medica, affording a striking instance of facts, once well known being forgotten until they are rediscovered. It is remarkable that the African slaves in the West Indies are also acquainted with this property of the root of the pomegranate, which they must have learned in their own country, probably from the prevalence there of Mohammedan works on medicine, or of the practice which is inculcated in them.—*Eng. Cyc.*

(6646) PUERARIA TUBEROSA, (Hedysarum tuberosum of Roxburgh), Shimeeya batrajee, *Beng.* a native of the Circar mountains, the bruised root is used as a poultice to swellings of the joints.—*O'Shaughnessy, page* 316.

(6647) PULLICATES. Cotton checked handkerchiefs, of various colours.—*Faulkner.*

(6648) PULPUL, *Hind.*, MYRTUS PIMENTA. Allspice. This is imported.—*Riddell.*

(6649) PULQUE. The saccharine and mucilaginous sap of the Agave americana may be made to flow by incisions in the stem: it readily foments, and in Mexico yields on distillation an agreeable ardent spirit, called vino mercal. The incisions are made just before the flower scape is ready to burst. The dried flowering stems of A. americana also afford an almost impenetrable thatch; the fresh green leaves are cut up and given to cattle, and the centre of the flowering stem, split longitudinally, is by no means a bad substitute for a European razor strop, owing to minute particles of silica forming one of its constituents. The two products most deserving attention however are the extract which forms a lather like soap, and the fibre known in Southern India as the pita. The Mexicans also make their paper of the fibres of Agave leaves laid in layers.

(6650) PULSES. The generic name in Malay and Javanese for all leguminous plants, is kaching, by adding an epithet to which we have the name of the species. Several species are regular objects of cultivation, as Phaseolus max, lunatus and radiatus; Dolichos kachang; Lablab vulgaris; Soja hispida; Cytisus cajau, and Arachis hypogæa.—*Crawfurd, Dict. p.* 361.

The following are the Pulses Cultivated in Madras as Food for Man or Beast.

Botanical Name.	English Name.	Hindoostanee Name.	Tamil Name.
Medicago sativa,	Lucern,		
Trigonella fœnum græcum,	Fenugreek,	Maitee or meetee bajee,	Vendium.
Psoralea corylifolia,	Hazel-leaved psoralea,	Bawurcheen,	Karpooga Arisee.
Cicer arietinum,	Chick pea, Bengal gram,	Chenna,	Cadalei.
Ervum lens,	Lentil,	Moosoor,	Mussoor purpoo.

Botanical Name.	English Name.	Hindoostanee Name.	Tamil Name.
Pisum sativum, ...	Common pea,...	Buttan,...	Puttani.
Phaseolus vulgaris, ...	French bean, ...	Bakla, ...	French beansoo.
Phaseolus lunatus, ...	Duffen bean, ...		
Phaseolus radiatus,......	Green gram, ...	Haree moong,..........	Putchay payroo.
Phaseolus mungo, ...	Moong or moonsh,......	Marh,....................	Oolandoo.
Dolichos uniflorus, ...	Madras gram,.....	Kooltee,...................	Kolloo.
Dolichos sinensis, ...	Chinese dolichos,........	Sufleed loheh,............	
Lablab vulgaris,........	Bullar, ...	Saimkaputtee,............	Mutchay cottay.
Psophocarpus tetragonolobus, ...	Winged pea, ...	Pank ke mutur, ...	
Canavalia gladiata,.......	Sword bean, ...	Lal kudsumbah, ...	Segapoo Thumbetten.
Cajanus indicus,.......	Pigeon pea,..	Toor dhal, ...	Thovaray purpoo.

M. E. of 1857.—Most of these may be referred to under their several heads.

(6651) PULWUL. Trichosanthes Dioica. Dioceous Snake Gourd. This is one of the snake gourd species, of a small description, the size of an egg; the seed is sown in the cold season and yields fruit from March to September.—*Riddell.*

(6652) PUMMICE STONE.

Poosa ray, Tel.
Pierre ponce, Fr.
Brimstein, Ger.
Pietra pomice, It.
Pumex, Lat.
Piedra pomez, Sp.

A light spongy, vitreous stone, found usually in the neighbourhood of volcanoes, and supposed to be a lava or volcanic glass. It is used for polishing metals and marble, and smoothing the surface of wood and pasteboard. Pumice is quarried and exported in large quantities from Lipari and the Isles Ponxa, in the Mediterranean.—*Faulkner.* Pummice stone in small pieces and very hard is found on the Sea Coast near Nezampatam.—*Rohde, M.S.S.*

(6653) PUMPKIN, Red and White.

Kuddoo, Hind.

This vegetable grows in great abundance in all parts of the Deccan. It is much esteemed both by the Europeans and natives. It is generally sown at the commencement of the rains, and requires no particular care; the soil should be light and good. When young, about the size of a goose egg; if cut and boiled, it will be found to resemble the artichoke-bottom dressed in the same way.—*Riddell.*

(6654) PUMPKIN, White, or White gourd, or pumpkin. *Benincasa cerifera.* The Karens and Burmese cultivate a species of pumpkin or gourd, never eaten by Europeans, which they esteem a valuable addition to their curries. —*Mason.*

(6655) PUNA or POON. This wood is commonly called Peon in England. It is used for masts, yards, &c; is the wood so much spoken of by persons from Ceylon. It certainly is of a good quality, and superior to that of Malabar; but, from its small dimensions, its scarcity, and the trouble in obtaining it, is of little consideration. The largest said to have been found was eighteen inches in diameter, and sixty feet in height; but the largest Edye could discover was not more than nine inches in diameter, and thirty-five feet high. In quality it is much the same as the first sort in Malabar, which may be obtained at Mangalore from the native merchants at all times when the coast is open (viz. from November to April), of three feet in diameter, and one hundred and ten feet long for the sum of 150*l.* sterling.—*Edye. Ceylon.*

(6656) PUNDE CYANN, the Tamil name of a Ceylon tree which grows to about twenty inches in diameter, and twelve feet in height. It is a close grained wood and resembles the English pear tree. It is used by the natives for various purposes in making farming utensils.—*Edye, Ceylon.*

(6657) PUNGUL, the Tamil name of a tre which grows to about eighteen inches in diameter, and twelve feet in height. It is of little use. Its fruit, and also its juice, are used as applications to ulcers, &c. From the seed a fixed oi is prepared which is considered valuable in rheumatic pains, bruises, &c.—*Edye. Ceylon.*

(6658) PUNICA GRANATUM. (Pomegrante.)

Darimba, Sans.
Dalim, Darim, Beng
Anar, Gulnar, Hind. Pers. & Duk.
Buloositoon, Rooman, Yunani.
Madalum pullum. Tam.
Rana, Arab.
Dadima pundoo, Tel.
Rumom paio, Mal.
Delima, Malay.

Parts used.

Fructus Cortex.
Baccæ tunica exterior, D.
Rind of the Fruit,
Granati Radix, E.
Radicis Cortex, D.
Flores, D.
Flowers of the Pomegranate. *Icosandria Monogynia*, Linn.

The Pomegranate, a native of the mountainous countries from Syria to the north of Indi must always have been an object of attentio It is the *rimmon* of the Bible, and the *rooman* (the Arabs. It was well nown to the Greek and Romans.—*Royle.* A native of Cabul, Bokharra, Mezenderan and Asia Minor generally; common now in almost all warm climates; the best fruits are those of Balabagh, lying under the snowy hills, near the Cabul river. Very large quantities are annually imported into the north of India from Cabul, and Cashmere. In the Himalayas and the *planes* the pomegranate also occurs, but of inferior quality; the fruit is small, and is sold in the Bazar under the name of *darmee*; the rind, *nas Pal,* is used in medicine and in dyeing, on account of its great astringency.—*O'Shaughnessy.*

Stem arborescent and irregular in arid situations rather thorny; the leaves usually opposite, often fascicled, oblong inclining to lanceolate, quite entire, not dotted, smooth, shining, and of a dark green; flowers commonly solitary, of a brilliant scarlet; calyx thick and fleshy, adhering to the ovary, turbinate, 5 to 7 cleft; petals 5 to 7, crumpled; stamens numerous, often double; style filiform; stigma capitate; fruit of the size of a large apple, with a thick leathery rind, and crowned by the tubular limb of the calyx; cells several, arranged in two strata, separated from each other by an irregular transverse diaphragm, lower division of 3 cells, the upper of from 5 to 9 cells; seeds numerous, involved in pellucid pulp, with foliaceous, spirally convolute cotyledons.—Nees von E. 301.

The parts of this plant which were employed by the ancients, still are so in the East, and are official in the D. P. Thus the Flores, D. are the *Balaustion* of the ancients. In India, *buloositoon* is given as the Greek name of the double flower. They are devoid of odour, but have a bitterish and astringent taste, tinge the saliva of a reddish-colour, contain Tannin, strike a black with ferruginous salts. The Rind of the fruit (*Granatum,* L.; *Buccæ Tunica exterior,* D.) especially of the *wild* plant, is extensively employed as an astringent and as a dye in the East. It is of a reddish brown colour and smooth externally, but yellow on the inside; usually in irregular fragments, dry, hard, and eathery, of a very astringent taste. It contains of Tannin 18.8 per cent, with 10.8 of Extracive, and 17.1 of Mucilage, and is used for tanning in some countries. The Bark of the Root (*Radicis Cortex*) was employed as an nthelmintic by Dioscorides and by Celsus, and till is so in India. It was reintroduced into practice by Drs. Buchanan and Anderson. The root itself is heavy, knotted, and of a yellow-colour; its bark often sold in strips, sometimes with parts of the root still adhering to it. On he outside of a greyish-yellow colour; on the nside, yellow, something like that of the barbery. It has little smell; when chewed, colours the saliva yellow; has an astringent taste, without any disagreeable bitterness. It has been analyzed by Metouart and Latour de Tric, and others; but the source of its peculiar anthelmintic powers has not been discovered, and the subject requires further investigation. It contains Tannin (about 20 per cent.), Gallic acid, Resins, Wax, Fatty matters, and Mannite. "An infusion yields a deep-blue precipitate with the salts of Iron, a yellowish-white one with solution of Isinglass, and a greyish-yellow one with Corrosive Sublimate, and Potash or Ammonia colours it yellow." (*c.*) It is apt to be adulterated with the barks both of box and of barberry. The former is white and bitter, but not astringent; the latter yellow, very bitter, and not thus affected by the above four reagents. All parts are astringent, the rind of the wild fruit especially so, and useful in Diarrhœa and advanced stages of Dysentery; the Flowers in infusion slightly astringent; the Bark of the Root astringent, but remarkably useful as an Anthelmintic against tænia. It may be given in doses of one scruple in powder; or a decoction may be formed by steeping for 12 hours *fresh Root-bark of Pomegranate.* —*Royle.* The *pericarp* is hard, smooth, a line in thickness, olive brown externally, yellowish within, inodorous, externally bitter and astringent, much used in tanning and in dyeing yellow; also as a medicinal astringent. The juice of the fruit is acidulous and sweet, and makes a pleasant sherbet for fever patients.—*O'Shaughnessy, pages* 338, 339. The Seeds, Dried, *Anardna, Naspal* of Punica granatum; the Pomegranate, with their fleshy envelopes are sold, and used in sherbets: all are plentiful at Ajmeer, considered cooling. Naspal is the bark of the fruit, and is only used in dying. The bark of the root though strongly purgative is not used in medicine. Large quantities of fine pomegranates are annually brought from Cabul to Ajmeer.—*Gen. Med Top. p.* 125. In the Dekhan there are two varieties of this tree, bearing white and red fruit—both sweet, but much inferior to the dried brought from Persia and Bussorah to the Bombay market. The tree grows easily from seed, and large fine juicy fruit, where the soil is good, is often produced. There is a variety which is generally sour, used by the Natives for sherbet. The dried bark of the root is made into a decoction and given for worms. By a continuation of layers from successive plants the fruit becomes almost seedless.—*Riddell.*

(6659) PUPA. In Entomology this term is applied to the third stage of existence of an insect, the egg being the first stage, and the larva or caterpillar, the second.—*Eng. Cyc.*

(6660) PUPIVORA. In Entomology this term is applied by Latreille to his second great section of hymenopterous Insects—a section the species of which are distinguished by their having the abdomen attached to the thorax, in most cases, by a slender stalk, and not, as in the first section (*Securifera*), forming as it were a continuation of the thorax. The females are furnished with a slender bristle-like ovipositor, and in this respect they also differ from the greater portion of the *Securifera*. The larvæ of the *Pupivora* have no feet, and most of them are parasitical. Latreille divides this section into two groups, the *Evaniales* and the *Ichneumonides*, distinguished chiefly by the insertion of the stalk or basal portion of the abdomen. In the *Evaniales* the stalk is attached to the thorax, and in most cases immediately under the scutellum; they have distinct nervures to the wings, and those of the upper pair form cellules; the antennæ are filiform, or setaceous, and composed either of thirteen or fourteen joints; the mandibles are toothed on the inner side; the maxillary palpi have six joints, and the labial four; the ovipositor is generally exserted, and composed of three slender pieces. Dr. Leach regarded the present group as constituting a family, and applied to it the name *Evanidæ*; compared with the next section of the *Pupivora*, the present one is very limited in species. Mr. Stephens, in his 'Systematic Catalogue of British Insects,' only enumerates five species, and these constitute three genera, *Evania*, *Brachygaster*, and *Fœnus*. In the *Ichneumonides* the abdomen has its origin between the two posterior legs; the nervures of the upper wings form cellules; the antennæ are generally filiform or setaceous, and composed of many joints (sixteen at least); the mandibles are in most cases destitute of denticulations on the inner side, and are bifid at the apex; the maxillary palpi are always distinct, and seldom have more than six joints. Of this group the species are exceedingly numerous. Mr. Stephens states that he possesses 800 British species of this family. The *Pupivora* appear to be destined to prevent other tribes of insects (particularly the *Lepidoptera*) from becoming numerous. The *Ichneumonidæ* may be seen during the summer months in great numbers flying from plant to plant in search of the caterpillars which are suited to furnish the proper food and to rear their larvæ, each caterpillar apparently having its own peculiar parasite, or parasites, for sometimes several species of Ichneumon attack the same larvæ. The female Ichneumon, by means of her long bristle-like ovipositor, inserts her eggs in the body of the caterpillar in such a manner, and in such parts, that it does not destroy the life of the victim. In most cases these eggs are not hatched until the caterpillar has changed into a chrysalis; they then hatch, and the Ichneumon larvæ feed upon the contents of the pupa case, inclose themselves in silken cocoons, and undergo their final transformations, to come forth in proper season, eating their way through the chrysalis case. Instances are not uncommon in which the eggs of the Ichneumon hatch in the body of the living caterpillar, and, what is most remarkable, they do not destroy its life. It is not until the larvæ have quitted their abode in the caterpillar that it dies, having the cocoons of the Ichneumon larvæ attached to its skin. The caterpillar so abundant on cabbages, and which is that of the common white butterfly, affords a familiar example of this nature. At certain times of the year numbers of those caterpillars may be seen on walls adjoining gardens: on these they usually attach themselves (in some sheltered situation) to undergo the transformation into the pupa state. One of these caterpillars will appear healthy, select a convenient situation, attach itself (as usual before the change into the pupa state) by means of a silken thread around its body, but instead of undergoing the transformation, we shall find it after a short time covered with an immense number of small yellowish silken cocoons spun by the larvæ of the Ichneumons as they crawl from its body.—*Eng. Cyc.*

(6661) PUPLI CHUCKAY. The bark of the Pupli root yields an orange dye, and is treated with alum, Myrobolans, &c. This dye was exhibited from Bellary, Mysore and Salem, at the Madras Exhibition of 1855. It was noticed by Buchanan (Mysore 1. p. 168.) and was named by him somewhat doubtfully as Ventilago? a Rhamnaceous genus. Flowering or fruit bearing specimens of this scandent shrub have not been procured to settle the point in question.—*M. E. J. R.*

(6662) PUPUNHA TREE, GUILIELMA SPECIOSA, Mart., is the Piritu or Pirijao of Venezuela, the Pupunha of the Amazon district, and the Paripou of Guiana. It is a palm, of an intensely hard wood, sharp needle like spines are thickly disposed in rings or bands, round its slender cylindrical trunk. The Indians subsist for months on its farinaceous fruit.—*Seeman.*

(6663) PUREE, a beautiful yellow Chinese pigment, in the composition of which the urine of the Elephant is said to be a chief ingredient. It is brought to China in round lumps of variou sizes in colour like orpiment, with a strong urinous smell, and little or no taste.—*Morrison*

(6664) PURSLANE. PORTULACA SATIV AND OLERACEA.

Choolee, HIND.

Round stem, fleshy leaves, and slightly acid. I is used as an ingredient in salads. It is reare by seeds sown at the commencement of th rains, and will thrive in any soil.—*Riddell* Leaves of a succulent nature harmless, tasteless and inodorous, many varieties are cultivated o the plains for their pretty flowers, raised from seed —*Jaffrey.* Purslane is as common a weed i the Tenasserim Provinces as it is in Americ and is used by the natives for a pot-herb.—*Mason.*

(6665) PUTCHAPAT. This is a well know article in Bengal. Its source was long doubt ful. We extract the following notice regardin it by Dr. Wallich, from the Transactions of the Medical and Physical Society of Calcutta for 1835. Dr. Wallich has also kindly favoured us with an additional note on the subject. " I shall now advert to another vegetable substance which, although most extensively used by the natives of this country, has hitherto continued one of the problems in our Indian Materia Medica. The drug to which I allude, is called n Bengallee as well as in Hindee, *Pucha Pat*, nd is found in every bazar, almost throughout Hindustan. My esteemed friend Baboo Radhakant Deb informs me, that "there exists no Sanscrita name for this leaf, which is largely mported by Mogul merchants; that it is used s an ingredient in tobacco for smoking, and for scenting the hair of women, and that the essenial oil is in common use for imparting the pecuiar fragrance of the leaf to clothes among the uperior classes of natives." I believe that the eople of the peninsula are peculiarly fond of his perfume, as are also the Roman Catholic nhabitants of this country generally.—*O'Shaughessy, page* 493.

(6666) PUTCHUCK; PUTCHUK: AUCK-ANDIA: COSTUS ARABICS. ARABIAN COSTUS, OOPLATE, KOOT.

Kust, ARAB.
Koot, Ooplate, GUZ. HIND.
Kushtam, SANS.
Putchuck, HIND.
Godu mahanel, CYNG.
Kooth, HIND.
Koostus, GREEK.
Kooshta, SYRIAC.

Sepuddy, MAL.
Kostum, Putchuck, TAM.
Changala, Kostom, TEL.
Faulkner.
Koost-i-Hindee and
Koost-i-ARABEE. PERS.
Pucha, MALAY.

Is the name by which a fragrant root is esignated in the price-currents of Calcutta nd Bombay, whence it is exported to Canon, being highly esteemed by the Chinese s an incense. From the places of export his would appear to be a product of India, but either the plant which yields it nor the place here it grows were discovered until very reently. The discovery is interesting, as the utchuk is a substance which was known to the ncients. Dr. Royle, while in the north-western rovinces of India, obtained a root which formd a considerable article of commerce, and which as said to be brought from still farther north, at is, from Lahore. It was warm and aroatic in taste, fragrant in odour, and frequently lled Orris-Root (Iris-Root) by Europeans in ndia, though by the natives in Northern India is called Kooth. On comparing specimens of ooth which he obtained in Northern India with hat was called Putchuk in Calcutta, he found at they were identical, and he was subsequent informed by Mr. Beckett, who was long seted as a merchant in Northern India, that hat the latter purchased from Umritseer uner the name of Kooth he sold in Calcutta by that of Putchuk, so that there can be no doubt of the identity of the two substances; but all that had been ascertained with respect to the place where it was produced was, that it seemed to be to the north of the Sutlej. Kooth, being used in India as a medicine, as well as exported to China, is described in the Persian works on Materia Medica in use in that country, and has assigned to it Kust as the Arabic, Kooshta as the Syriac, and Koostus as the Greek name. Three kinds are described. Dr. Royle states that he was only able to meet with two kinds in India, one called Koost-Hindee, and the other Koost-Arabee. These evidently refer to two of the three kinds of Costus described by Dioscorides as the Arabian, Indian, and Syriac. ('Illust. Himal. Bot.,' p. 360.) There can be little doubt therefore that the Kooth or Putchuk is one of the kinds of Costus of the ancients, which was highly esteemed by them, and formed an ingredient in their most famous compound alexipharmic confections, such as the Theriaca and the Mithridatium. It was also highly esteemed by them as an incense, as, in the line of Propertius—" Ure puer costum Assyrium redolentibus aris"; and is mentioned by Horace as 'Achæmenium costum.' ('Od.,' iii. 1.) The identity of Kooth and Costus was however long ago ascertained, though not generally known, as is evident in the following passage from Garcias ab Horto, in Clusius ('Exot.,' lib. x.) " Est ergo Costus dictus Arabibus Cost aut Cast; in Malacca, ubi ejus plurimus est usus, Pucho, et inde vehitur in Sinarum regionem." In MacCulloch's 'Commercial Dictionary,' Putchook is described as "the root of a plant growing in Sinde. When burned it yields a fine smell. The Chinese beat it into a fine powder, which they burn as incense in the temples of their gods." Of the Putchuk, $6697\frac{3}{4}$ bazar maunds, of the value of 99,903 rupees, were exported from Calcutta in the year 1837-38. On Dr. Falconer's proceeding on his journey to Cashmere, Dr. Royle requested him to make inquiries respecting this substance, and he discovered that it was exported from the valley in large quantities to the Punjab, whence it finds its way to Bombay and Calcutta; and that it is sold in China at an advance of about 300 per cent. on the price at which it is gathered in Cashmere. Dr. Falconer subsequently found it growing in great abundance all round the elevated summits of Cashmere. From the plants with which it is associated, and the circumstance under which the Koot grows, being one of the *Compositæ*, or Thistle tribe with feathered seed, of which when once established the dissemination becomes easy, Dr. Falconer has no hesitation in thinking that it could be produced to an unlimited extent, of the best quality, in the Himalayas at elevations of from 7500 to 9000 feet above the sea, and that the Choor Mountain alone might be brought in a few years to produce thousands of maunds of it. Preparatory to diffusing the Koot, or Costus, he has introduced it into the Himalayan nursery attached to the Saharunpore Botanic Garden. Finding that it belongs to a new genus, he has named it *Aucklandia*, in honour of George, earl Auckland, governor-general of India, "as a distinction well merited by his lordship's services in the cause of Indian Botany."—(*Royle, on the Productive Resources of India.*) Costus Arabicus: is supposed to be the root of the Aucklandia costus, a genus of the thistle tribe. It is grown in the mountains of Cashmere, where it is called Koot, is a gregarious herb, six or seven feet high. Its roots are dug up in September or October, chopped up into pieces from two to six inches long and exported without further preparation. The greater portion being sent via the Punjab to Bombay, whence it finds its way to the Red Sea, Persian Gulf and China. Another portion being sent across the Sutlej and Jumna to Hindustan. In Cashmere the cost of its collection and transport to a mercantile depot, is about 2s. 4d. per cwt: but at Jugadree on the Jumna, it has increased to about 16s. 9d. or 23s. 4d per cwt. and in the Chinese ports it fetches nearly double that price the cwt. The Chinese burn the roots as incense in the temples of their gods; and they also attach great efficacy to it as an aphrodisiac. The imports into Canton in 1850 were 854 piculs, valued at 5,150 dollars. In Cashmere it is chiefly used for the protection of bales of shawls against insects. The exports for Calcutta average about £1,500 annually.—*Simmonds*

(6667) PUTRANJIVA, an Indian genus of Plants, referred by Dr. Roxburgh to *Nageia*, but which has been separated by Dr. Wallich under the above name, which is a Sanscrit compound, consisting of the words, 'pootra,' a son, and 'jeeva,' life, in consequence of the seeds being strung by parents round the necks of children, under the supposition that they will preserve them in health. They are sold in bazars throughout India for this purpose. *P. Roxburghii*, the only species known, forms a large timber-tree, with an erect straight trunk, and a white close-grained very hard wood. The head is large and shady, composed of numerous spreading branches, with shining dark green leaves arranged on two sides of the branchlets. The flowers are diœcious, the male ones crowded together; the perianth small, calyx-like, 4-5-leaved; corolla none; stamens three; filaments thread-like, all or only two united together, and the third free. The female flowers solitary in the axils of the leaves, with long foot-stalks; perianth 5-leaved; ovary ovate, oblong, 3-celled; cells 2-seeded; styles three, filiform; stigmas crescent-shaped and toothed; drupe 1-seeded. Young plants of this tree have been cultivated in moist stoves in Britain. The genus has been referred to the natural family of *Myricaceæ*, but is considered by Endlicher as more nearly allied to the *Antidesmeæ.*—*Eng. Cyc.*

(6668) PUTRANJIVA ROXBURGHII. Wall. Tentam. p. 61. Nageia Putranjiva, *Roxb. Fl. Ind.* iii. p. 766. Royle's Illust. 100.

Curroopallay marum, Tam.

Though generally diffused throughout India, Dr. Wight had not seen this tree, but Roxburgh describes it as a large timber tree with an erect straight trunk. The wood is white, close grained and very hard.—*Wight.* Coromandel, Patna, Monghir hills, and from Sylhet to the Kheree jungle. The Sanscrit name is compounded of *pootra*, a son; and *jeeva*, life. The Hindoostani name *jeeapootra*, is similarly derived. The nuts are strung by parents round the necks of their children, to keep them in health. *Roxb.*—*O'Shaughnessy, page* 611.

(6669) PUTTY. An ordinary name for the peroxide of tin, generally used for polishing mirrors and lenses, and for rendering glass white and opaque, converting it into enamel; and for other purposes in the arts.—*Waterston.*—*Faulkner.*

(6670) PUTTY GLAZIERS. Is prepared by kneading chalk with linseed oil.

(6671) PUTWA OF BHAGULPORE, a bast.

(6672) PYGATHRIX, M. Geoffroy's name for the Douc, or Cochin-China Monkey (*Lasyopyga*, Illiger) It has the following characters:—Head rounded; muzzle moderately prolonged; tail long; cheek pouches; hands longer than the fore arms and the legs; anterior thumbs very short and slender; no callosities; buttocks fringed with long hairs.

Dental Formula:—Incisors, $\frac{4}{4}$; Canines, $\frac{1-1}{1-1}$; Molars, $\frac{5-5}{5-5}$ = 32.

(6673) PYGATHRIX NEMŒUS, Geoff. (*Lasiopyga Nemæus*, Ill.; *Simia Nemæus*, Linn., 'Mant.'). This very rare monkey is perhaps the most remarkable of the whole tribe for the variety and liveliness of the colours with which it is marked, and which are the more striking from being distributed in large masses. The upper part of the head is brown with a dark-reddish chestnut frontal band. The cheeks are clothed with very long and whitish or yellowish-white hairs. The back, the belly, the arms, and the sides are gray with a somewhat greenish cast; the tail is whitish and so are the rump and the fore arms; the anterior fingers are blackish; the hips and thighs are blackish, and the legs of a brightish-red chestnut; the more exposed parts of the face are of a reddish tint. Length rather more than 2 feet when erect; length of tail about 1 foot 7 inches. It is a native of Cochin China.—*Eng. Cyc.*

(6674) PYGIUM ACUMINATA, Scarce, but found on the banks of streams in the Tounghoo district, attaining a girth of five or six feet, red wood, adapted to cabinet making.—*McClelland.*

(6675) PYLORIDIA, *Pyloridea*, M. De Blainville's name for his ninth family of *Lamellibranchiata*, which he thus characterises:—Body compressed, more and more cylindrical, the mantle more and more closed and prolonged backwards by two long tubes which are ordinarily distinct, with an anterior and inferior aperture for the passage of a very small and ordinary conical foot; branchiæ narrow, free, and prolonged in the tube.

(6676) *Pandora Obtusa*, is an abundant British species.

(6677) *Anatina.* Animal oblong, rather thick, having the mantle closed by a rather large membranous lamina with a small rounded aperture at the antero-inferior part for the passage of a linguiform foot; two elongated tubes separated deeply at their extremity, the lower being rather greater than the upper; branchiæ narrow, free, and pointed backwards. There are 20 living species known. They inhabit India, the Philippines, New Zealand, and Western America. There are 50 fossil from the Devonian and Oolitic Rocks. *Periploma*, *Cochlodesma*, and *Cercomya* are sub-genera.

(6678) *Anatina Subrostrata*, has the shell ovate, membranaceous, anterior side attenuated and subrostrated. It is a native of the seas of Australia. Lamarck adds, the Indian Ocean. The *Anatinae* have hitherto been found for the most part in sands and shallow water.

Lutricola.—Body oval, very much compressed or subcylindrical, the mantle only closed in the half of its lower border; foot small, projecting but little beyond the abdominal mass; tubes long, distinct or united. There are 18 species of *Lutraria* found in the United States, Brazil, the Mediterranean, Senegal, Cape of Good Hope, India, New Zealand, Sitka, and the British Islands. There are 40 species of *Psammobia*. They are found in Norway, the British Islands, New Zealand, and the Pacific. *P. gari* is eaten in the Pacific.

(6679) *Soletellina.*—Shell oval oblong, compressed, with sharp edges, both curved; equivalve, subequilateral, much more wide and rounded at the cephalic extremity than at the other, which is more or less attenuated and sub-carinated.

(6680) *S. radiata* (*Solen rostratus*, Lam.). Shell transversely oblong, violaceous, with many obscure rays; anterior side attenuated and rostrated. It is found in Oriental seas.—*Eng. Cyc.*

(6681) PYRETHRUM (from πῦρ, fire, because of the hot taste of the root), a genus of Composite Plants belonging to the tribe *Asteraceæ*. It has a hemispherical involucre, the receptacle flat or convex. The fruit angular and not winged. The pappus an elevated membranous border.—*Eng. Cyc.*

(6682) PYRETHRUM, ANACYCLUS (*Anthemis; Linn.*) Pyrethrum, *Dec.* Pellitory of Spain.

Akerkurra, HIND.	Akerakaru, TEL. TAN

This root was known to Dioscorides (πυρεδρον), and is still employed in Eastern medicine by the name *akurkurha*. The plant is a native of the north of Africa, whence it has been introduced into the south of Europe. Hayne believes that the root is yielded by a nearly allied species, which he calls *A. officinarum*, ix. t. 46, and which he found cultivated in Thuringia.

Anacyclus Pyrethrum has a long fusiform root. Stems numerous, procumbent, branched, pubescent. Radical leaves spreading, petiolated, rather smooth, pinnatified; the segments pinnated; with linear tubulate lobes; stem leaves sessile. Branches one-headed. Heads many-flowered. Involucre in few rows short, somewhat cup-shaped, scales lanceolate, pointed, brown at the edges. Receptacle convex, with oblong, obovate, obtuse paleæ. Florets of the ray female, sterile, white above and purplish beneath; of the disk, yellow, tubular, with 5 callous teeth. All the corols with an obcompressed, 2-winged tube without appendages. Style of the disk with exappendiculate branches. Achænium flat, obcompressed bordered with broad entire wings. Pappus short, irregular, tooth letted, somewhat continuous with the wings on the inner side. *Dec.*—Desf. Fl. Atl. ii. 287. Nees and Ebern. 244. St. and Ch. iii 97.

The root, as described by Desfontaines, in its fresh state is fusiform and fleshy, about the thickness of the finger, brownish-coloured externally and white within. When handled in this state, it produces first a sensation of cold, soon followed by heat. It is without odour, but has an acrid pungent taste, and causes a copious flow of saliva. It is said to be imported from the Levant. The French obtain it from Africa. It is cultivated in Thuringia and at Magdebourg. The active principle is soluble both in Alcohol and Ether, and appears to be a Volatile Oil, which adheres with tenacity to its Resin (*Pyrethrin*) and Fixed Oil. It also contains Inulin, Gum, a little Tannin, Colouring matter, various Salts, and Ligneous fibre. *Uses.* Irritant, Sialogogue. Sometimes used to relieve Toothache, or as a Masticatory in palsy of the Tongue and relaxation of the Uvula.—*Royle.*

(6683) PYRETHRUM INDICUM. FEVERFEW. Feverfew a gaudy flowered annual, usually denominated a Chrysanthemum, but which the botanists have removed to another genus, is often seen in gardens in Maulmain.—*Mason.*

(6684) PYRITES, FERRI SULPHURETUM. Sulphuret of Iron. Iron Pyrites.

Sulfure de Fer, FR.	Schwefeleisen, GER.

Iron combines with Sulphur in several proportions. It is common in the form of the

Bisulphuret, of a yellowish colour; hence has been thought to contain Copper. It was no doubt known to the ancients. *Prop.* The natural Bisulphuret ($Fe S_2 = 60$) or Iron Pyrites, called also Mundic, is of a colour like Brass, in hard cubical crystals, which are not acted upon by any of the acids, except the Nitric. Sp. Gr. 4·98. Often heated for the separation of the Sulphur by sublimation. If moistened and exposed to the air, Oxygen is absorbed, and the Sulphuret converted into Protosulphate of Iron. —*Royle.* Very abundant in the schistose rocks of Cuddapah, where it is manufactured into Sulphur.—*Ed.* Iron pyrites are very abundant in the Tenasserim Provinces. In some places they contain arsenic, and constitute arsenical sulphuret of Iron. The Burmese names though usually applied to iron, are generic, and might be applied to any pyrites.—*Mason.*

(6685) PYROLA. Herb of Chimaphila umbellata.—*Ben. Phar.*

(6686) PYROLIGNEOUS ACID, ACIDUM PYROLIGNEUM, E. "Diluted Acetic Acid, obtained by the destructive distillation of Wood." Pyroligneous Acid is considered to be a discovery of Glauber; but it is probable, as stated by Berzelius, that it was known to the Egyptians, as may be inferred from a passage of Pliny, in which Pine wood, heated in a furnace, gives out "sudore, aquæ modo, fluit canali; hoc in Syria *cedrum* vocatur, ac tanta est vis, ut in Ægypto, corpora hominum defunctorum, eo perfusa, serventur." In the present day the distillation is usually conducted in iron cylinders, with condensers attached. The woody matter being decomposed by heat, its elements unite to form fresh compounds, and by distillation an acid liquor passes over with water, tarry matter, Empyreumatic Oil, and much inflammable gas, while a large proportion of excellent Charcoal is left in the retort. The Pyroligneous Acid is a brown, transparent liquid, consists essentially of Acetic Acid, diluted with water, holding in solution tar, with some Empyreumatic Oil, and has a smoky smell. It is distilled, and further purified, by the addition of Carbonate, of Soda. This is retained as Acetate of Soda (*v.* p. 100), or used for making a purer Acetic or Pyroligneous Acid. When the acetate of the above Alkali is formed, it is purified by crystallization and re-solution, afterwards decomposed with Sul. Acid the Acetic set free is again distilled, and the processes repeated until a nearly colourless acid, with the odour of the Acetic, is produced, but which is often Empyreumatic. Nearly or entirely colourless; Sp. Gr. at least 1.034; M. C. neutralize at least grs. liij. of Carb. of Soda; unaffected by Sulphuretted Hydrogen or sol. of Nitrate of Baryta.—*Royle.*

(6687) PYROLIGNEOUS ACID, is made from Cocoanut Shell in India.

(6688) PYROPE. PALI. A variety of the garnet, either identical or nearly resembling the pyrope garnet, is brought from Burmah. It is characterized by giving to transmitted light a yellow tinge, or as the natives say, the colour of the ox's gall; and hence the Burmese name, which in Pali signifies ox-gall.—*Mason.*

(6689) PYRUS, the Latin word for Pear-Tree, is the name of a genus of plants belonging to the natural order *Rosaceæ.* This genus is characterised by having a superior calyx with a 5-lobed limb; roundish petals; five styles; the fruit a closed 5-celled pome with a cartilaginous putamen called the core; two seeds in each cell; the testa cartilaginous. The species are trees or shrubs with simple or pinnate leaves, and the flowers placed on terminal many-flowered cymes. The species of this genus have obtained various names, as apples and pears, Crabs, Beam-Trees, and mountain-Ashes.

(6690) PYRUS AUCUPARIA, the Rowan-Tree, or Roan-Tree, known also under the names of the Fowler's Service-Tree and Mountain-Ash. Its Latin name, *P. aucuparia*, and its various modern designations, have been given to it on account of the general use made of its fruit for the purpose of decoying birds into traps. It is much cultivated, both on account of its valuable wood and rapid growth It is known from the other species of *Pyrus* by its slightly glabrous serrated leaflets and its globose fruit. It is found in most parts of Europe, in the north-west of Asia, in Nova Scotia, and other regions of the northern parts of North America, and in the island of Japan. It does not however attain equal magnitude in all climates. In its most northern localities and alpine situations it is a low shrubby bush; whilst in southern districts it forms a handsome tree, growing to the height of 20 or 30 feet. The finest trees in Britain are found in the Western Highlands and on the west coast of Scotland. This tree has enjoyed from remote times a distinguished reputation. A belief in its power against witchcraft and evil spirits of all kinds seems to have been prevalent at a very early date; and, according to Lightfoot, in his 'Flora Scotica,' it was till a late period held in high reputation in Scotland as a charm against evil influence. It is through a hoop of this wood that sheep are made to pass night and morning as a preservative against evi spirits. The Rowan-Tree is a graceful tree, with an erect stem and orbicular head. It grows very rapidly for the first three or four years of its existence, and on this account it is well adapted for planting with young oaks, which it protects till they grow above it, when it is destroyed by their shade. It also forms excellent coppice-wood, the shoots being adapted for poles and for making hoops. The bark is used by tanners. The leaves, when dried, have been sometimes used in the north of Europe as a substitute fo wheat in times of scarcity. It is prized next to yew for making the bow. In Wales it is as religiously planted in churchyards as the yew is in England.—*Eng. Cyc.*

(6691) PYRUS COMMUNIS.

Amrud, Hind.

The Pear, has ovate serrated leaves, glabrous on both surfaces, with umbellate peduncles. It is a native of Europe in woods and hedges. In its wild state it is thorny, but always unarmed when cultivated. It is the pear Tree of English orchards. It is easily distinguished from the apple-Tree by the shape of its fruit.—*Eng. Cyc.* The Pear tree is not common in the Deccan gardens though some trees are to be found having been brought chiefly from Bangalore; the fruit is of a tolerable large size but coarse and hard, which only renders it fit for baking and stews. The same kind of fruit is found in the upper provinces of Bengal.—*Riddell.*

(6692) PYRUS CYDONIA. Pomaceæ.

Behee, Hind.

The quince. This tree has probably been introduced from China or Bengal, and is now to be met with in many gardens. It grows like the apple. The fruit is plentiful at Sattara, and Dr. Riddell met with it at Poonah. In other parts of the Deccan he has seen the tree in blossom, but the fruit did not set,—perhaps for want of proper treatment.—*Riddell.*

(6693) PYRUS MALUS. Pomaceæ.

Seb or Seo, Duck.

Pyrus Malus, the Apple, has acute serrate ovate-acute leaves; flowers in a sessile umbel; the fruit globose, and the styles combined below. This s the Crab-Tree of English hedges when wild, or the Apple-Tree of their orchards. Other species of *Pyrus* besides the above yield edible fruits. On Mount Sinai grows a species called *P. Sinacia*, whose fruits is hard, gritty, and austere, and whose leaves are gray with down; in Germany a similar kind, the *P. nivalis*, is by no means uncommon, with a considerable resemblance to the last; Siberia and Persia produce another, called *P. salicifolia*, with very narrow hoary leaves; and in the former country are found the Siberian Crab, *P. prunifolia*, and the Berry-fruited Crab, *P. baccata*, whose fruit is too small for ordinary consumption, but is often seen in the form of a sweetmeat. Besides these, the Chinese Crab, *P. spectabilis*, and also *P. coronaria*, are cultivated for their flowers.—*Eng Cyc.*

The two sorts of apples commonly found in most Native gardens in the Deccan, are said to have been first introduced from Persia. They are of a small description; one sweet and luscious, grows in bunches; the other, which is larger, has a rough taste, and is better adapted for tarts. They may be propagated by layers, suckers, and even cuttings. The young plant should never be allowed to throw out branches at less than two or three feet from the ground; all the buds beneath must be rubbed off. Never plant them closer than from nine to twelve feet to each other, and if there is sufficient ground, keep them separate from other trees, so that they can either be wintered or watered as required. Remove all suckers round the stem of the tree, or from the roots, [unless required for stocks,] then cut them clean off with a sharp knife. The trees may be opened immediately after the rains, if not in blossom. Pluck off all the leaves carefully, and beware, in so doing, that the blossom buds are not injured, which native gardeners in the careless manner of stripping the leaves, are very apt to do;—then prune the tree. As soon as the blossom appears set, put plenty of old rich manure to them, and water well every third day until the fruit is nearly ripe. If you continue watering after this, it makes the fruit mealy and insipid. When the fruit is all gathered, cease to water the trees, and as soon as the leaves turn brown and dry, which will be in the course of a month, then open the roots for two or three days, cover with manure again, and water well as before, when you may probably get a second crop in April or May.—*Riddell.*

(6694) PYRUS: Pear Tree. Wallich found a species of pear tree growing on limestone mountains, near the Irrawaddy; and it may exist in the Tenasserim Provinces, though Mr. Mason has never met with it.—*Mason.*

Q.

(6695) QUADRUMANA, Cuvier's name for is second order of Mammiferous Animals, an rder which must be always viewed by the oolgis with great interest, inasmuch as it conains those forms among which will be found he nearest approach—though the distance is till great—to Man.

The order *Primates* of Linnæus consisted of the genera *Homo*, *Simia*, *Lemur*, and *Vespertilio*.

(6696) QUAIL, Mr. Gould recognises the common Quail of India as distinct from the European Quail.—*Bligh.*

(6697) QUAKING GRASS. Briza.

(6698) QUAMOCLIT, a genus of climbing plants of the natural family of *Convolvulaceæ*, chiefly found in the hot parts of America, but species are indigenous both in India and China. The genus is characterised by having a 5-leaved calyx. Corolla somewhat salver-shaped, plicate, and 5-lobed. Stamens, 5, inserted into the base of the corolla. Ovary 4-celled. Cells with single ovules. Style simple. Stigma capitate and bilobed. Capsule 4-celled, 4-valved. Seeds 4, erect. Climbing plants with the leaves alternate, cordate, entire, lobed, or pinnatifid; peduncles axillary; one or many flowers of a red colour. *Q. vulgaris* is common in every part of India, and, being a beautiful plant, has been cultivated in England as a tender annual. The name of the genus has been taken from that of this species, which was *Ipomœa Quamoclit*, the latter name signifying Dwarf-Bean, because, though smaller, it resembles the kidney-bean in its habit.—*Eng. Cyc.*

(6699) QUAMOCLIT ALBA. PURE WHITE.—Common, easily grown from seed.—*Jaffrey.*

(6700) QUAMOCLIT PENNATUM. *Syn.* IPOMÆA QUAMOCLIT. Jasmine rouge. This beautiful little creeper which the French and Burmese call red jasmine, the English China creeper, and the botanists quamoclit or dwarf bean, is quite naturalized throughout the Tenasserim Provinces, the French name is both more descriptive and euphonious than either of the others.—*Mason.*

(6701) QUAMOCLIT PHŒNICEA. This is a very handsome climber with flowers crimson, tube long and slender; grows readily from seed. —*Jaffrey.*

(6702) QUAMOCLIT VULGARIS. INDIAN FORGET-ME-NOT.—Sometimes called the star creeper, from the shape of the flower which is of a deep rosy red.—*Jaffrey.*

(6703) QUARTZ, the Mineralogical name of numerous varieties of Rock Crystal, the Native Oxide of Silicon [SILICON], called also Siliceous or Flint Earth, and Silicic Acid. It is remarked by Mr. Brooke ('Mineralogy') that the "differences of structure, hardness, specific gravity, mixture with foreign matter, and other characters belonging to this species, are so numerous as to render any single description inapplicable to all its varieties." Some of the varieties of quartz have been already described; these we shall presently refer to. Quartz occurs crystallised and massive, and in both states it is widely diffused throughout nature, and is especially one of the constituents of granitic and the older rocks. In India, the finest specimens of crystallised quartz occur in Madura and at Vellum &c.; they are found in Cornwall and near Bristol of great brilliancy, and are known by the name of Cornish and Bristol diamonds. To enumerate the different places in which this substance occurs would be most endless. Quartz is composed of one equivalent of silicon = 14, and one equivalent of oxygen = 8; its equivalent is therefore 22.

Hornstone and *Chert* are varieties of compact quartz. Cavernous quartz is termed Spongiform Quartz or Swimming Stone, and other scarlet varieties have also been described.

Quartz possessing different colours has received various names; some of these we shall briefly notice.

Brown or Smoky Quartz occurs in fine crystals near Cairngorm in Aberdeenshire. It is used for seals and ornaments when cut and polished. The nature of the colouring-matter is not known, but is probably carbonaceous matter.

Purple Quartz or *Amethyst*, is found both crystallised and massive. It is of every shade of purplish-violet, and the colour in the perfect amethyst is pretty equal throughout the crystal or mass; frequently however the summits of the crystals only are coloured. It is used for ornaments. According to Rose, amethyst consists of—

Silica	97·50
Alumina	0·25
Oxide of Iron	0·75
	——98·5

Amethysts of the first quality are found in India, Ceylon, Persia, and Siberia. Amethystine Quartz of inferior quality is met with in most countries. In Cornwall it occurs in some tin-mines.

Blue Quartz (*Siderite*) occurs crystallised and massive. It is compact, of a grayish or greenish-blue colour. Lustre resinous, waxy. Translucent on the edges. It is found near Salzburg.

Green Quartz is found in Peru, in translucent hexagonal prisms. Opaque massive green quartz is called Prase; the colour appears to be owing to actinolite. It is found in Saxony. *Chrysoprase* is light green amorphous quartz; it is coloured by oxide of nickel. It is found in Silesia and North America.

Yellow Quartz is transparent; of various shades of colour. It is found in Cornwall, Scotland, Bohemia, &c. It is probably coloured by oxide of iron. It has been called Scottish and Bohemian Topaz.

Yellow Quartz is opaque. Ferruginous Quartz occurs of various shades of yellow and reddish-yellow. According to Bucholz, it contains 5 per cent of oxide of iron, to which it colour is owing. It is found near Bristol, in Scotland, &c.

Red Quartz (*Compostella*), Hyacinthin Quartz. Colour yellowish or reddish-brow It is found in Spain and North America.

Amorphous Quartz. The following are varieties of quartz: AGATE, AVANTURINE, FLIN FLINTY SLATE, OPAL, and BLOODSTONE.

In addition to these, which may be considere among the purer varieties of quartz, it occu mixed with variously-coloured clays and other xtraneous matter, forming different kinds of Jasper. *Jasper* occurs opaque, which constitutes ne of the most prominent differences between t and agate. Its colours are green, yellow, and ed, of various shades, rarely blue : these colours re occasionally mixed in spots and irregular eins. Jasper is massive, has often a resinous ustre, but is sometimes dull. It is found on nany parts of the continent, in Cornwall, and n Scotland. Striped or Riband Jasper presents green, yellow, and red colours of various shades, ometimes in spots; but the most beautiful ariety is composed of equal and parallel stripes f these colours. It occurs in Siberia, the Iarz, and Saxony. Egyptian Jasper, or Egyp- ian Pebble, occurs in rough roundish masses, nd is generally of a brown colour. Internally is usually of a light colour. It is found on the urface to the eastward of Grand Cairo, and on he borders of the Red Sea. It is well known hat siliceous earth assumes other forms besides hat of quartz and the varieties of it which have ow been described : one of the most useful f these is Common Sand.—*Eng. Cyc.* According Tomlinson, quartz is the mineralogical name f a substance widely diffused throughout nature, s in the numerous varieties of rock crystal or ative oxide of silicium, siliceous or flint earth, d silicic acid. Quartz is one of the constituents f granite and of the older rocks. It also oc- urs crystalized and massive. The primary rm of the crystal is a rhomboid, but it is gene lly found in hexagonal prisms terminated by exagonal pyramids, and when the prism is anting and both pyramids are present, the ystal is a dodecahedron with triangular planes he cleavage is not usually traceable by ordinary eans, but may often be detected by heating e crystal and plunging it in water. The eavage is parallel to the planes and pyramids the ordinary crystal. The fracture is conchoi- al, hardness 7.0 ; it scratches glass readily, and ves fire when struck with steel. It becomes sitively electrical when rubbed, and two pieces hen rubbed together in the dark become lumi- ous. It is transparent, translucent or opaque ; c lustre is vitreous or resinous : the specific avity 2.69 to 2.81. It is infusible, insoluble most acids ; but it combines with the fixed alka- s and produces silicates.

Pure quartz is colourless, but quartz usually hibits a great variety of colours. Purple artz or *amethyst* occurs both crystallized and assive : it is of every shade of purplish violet : contains alumina and oxide of manganese. agnificent crystals of this occur in the Hy- erabad territory and in Central India. *Blue* artz or *siderite* also occurs crystallized d massive. The *Cairngorm* or *smoky quartz* ntains a small quantity of bitumen. *Green* artz is found in Peru in translucent hexagonal prisms. Opaque massive green quartz is called *prase* : it is found in Saxony. *Crysoprase* is an amorphous quartz of a light green colour, oxide of nickel being the colouring matter. *Yellow* quartz, called *Scotch*, and *Bohemian topaz* is of various shades of yellow. *Opaque yellow* or ferruginous quartz contains about 5 per cent. of oxide of iron : it occurs in various shades of yellow and reddish yellow. *Red* quartz, or *Compostella hyacinthine* quartz, is of a yellowish or reddish-brown.—*Tomlinson.*

(6704) QUASSIA.

Bois de quassie, Fr.	Leno de Qussia, Sp.
Quassienholz, Ger.	

An intensely bitter wood, obtained from the *Q. Excelsa* of Jamaica, which furnishes the greater part of the chips sold as quassia by European druggists. The *Q. Amara* is a native of Surian, Guiana, Colombia, Panama, and has been recently introduced into Bengal. Quassia wood is a very pure and simple bitter, and has been much employed in bilious and intermittent fevers, gout, &c. It is also supposed to be used by some brewers as a substitute for hops, although forbidden by law.—*Faulkner.*

(6705) QUASSIA AMARA. Bitter quassia. The wood.

This native of Surinam, Guiana, Colombia, and Panama, was introduced into Bengal by Lord Auckland. It thrives tolerably well in the Calcutta Garden. *Med. uses.* Quassia wood is a very pure and simple bitter, and has been much employed in bilious and intermittent fevers, dropsies from debility, atonic gout, and indeed in all cases in which bitter tonics are advisable. The English brewers use it freely as a substitute for hops, although it is thought to have some degree of narcotic power, a decoction of quassia being much used as a poison for flies. Quassia is with much difficulty reduced to powder, and is consequently given in the forms of extract, tincture, infusion, and decoction.—*O'Shaughnessy, page* 267.

(6706) QUASSIA SIMARUBA. Bitter, or mountain damson. *Syn.* Simaruba amara, *Lindley*. *Off.* The bark.—*Ibid* 267.

(6707) QUERCITRON, the bark of the *quercus nigra*, or *tinctoria*, or yellow oak, a native of North America. It is prepared for use by taking off the epidermis and pounding the inner bark in a mill. Its colouring principle, *quercitrine*, forms pale yellow spangles ; it has a faint acid reaction; is soluble in alcohol, and to a certain extent in water. A decoction of the bark, deprived of its tannine by means of glue, produces a fine yellow upon fabrics mordanted with alum, and various shades of olive with iron mordants. It is much used in calico-printing.—*Tomlinson.* Quercitron bark is an important yellow dye, obtained from the bark of a species of oak (*Quercus tinctoria*, or *nigra*), indigenous to North America.—*Faulkner.*

(6708) QUERCUS; OAK.

Baalut, Arab.
Eeg, Dan.
Eik, Dut.
Chene, Fr.
Eiche, Ger.
Quercia, It.
Quercus, Lat.
Dab. Pol.
Roble, Carballio, Port.
Dub, Rus.
Roble, Sp.
Ek, Sw.

A genus of well-known timber trees (*Quercus*), embracing about 150 species. *Quercus*, the Latin word for an oak-tree, which is of frequent occurrence in the Roman writers. It is now, as then, applied to the oak and all the other species associated with it by botanists in one common genus. *Quercus* differs essentially from *Castanea*, the Chestnut, in having short obtuse stigmata, and from both it and *Fagus*, the Beech, in the cells of its ovary containing two ovules instead of four. It is also distinguished by its acorn or nut being seated in a cup, and not in a close husk; but there are intermediate conditions of this part, technically called the cupule, which render it of less value as a mark of distinction than would at first sight appear. Many of the oaks of the hotter parts of Asia have the acorn completely inclosed within the cupule. Still however the prickly husk of the beech and the chestnut, splitting into valves, may in general be distinguished from the closed-up cup of the Indian oaks. Oaks, like roses, are scarcely known in a wild state in the southern hemisphere. In the Islands of the Indian Archipelago they reach their most southern limits, especially in Java; thence they pass upwards beyond the equinoctial line, and following the eastern parts of Asia, they spread to the westward along the Himalaya Mountains, and reaching Europe, are only arrested by the Atlantic Ocean. On the other hand they find their way to the eastward of their Asiatic origin, and overrun America from Canada and Oregon, through California and Mexico, till their progress to the south is stopped by the Isthmus of Darien. While however the genus is thus extensively distributed, the species are confined within comparatively narrow territorial limits. Many of the Javanese kinds appear to be peculiar to the Indian Archipelago, or only occur near the south-eastern angle of Asia. Those of the Himalayas are perfectly distinct from the oaks of the Trans-Himalayan regions, and have not even been found on the mountains of Persia. Several of the Oriental kinds are known nowhere else, and the American species are quite peculiar to that country. The species are very numerous, and we propose to give some of the more remarkable according to their geographical distribution.—*Eng. Cyc.* All travellers in the Himalayas testify to the abundance of oaks. The people employed by Dr. Wallich gathered a considerable number of species, and Dr. Royle assures us that they are found from moderate elevations up to the limits of trees. Among these, all from the lower regions are no doubt, too tender for cultivation in Great Britain; but of the alpine species some may be expected to prove hardy.—*Eng. Cyc.* Several species are indigenous in the Tenasserim provinces. Mason says Wallich found seven different species of oak, Quercus fenestrata, turbinata, velutina, Quercus Amherstianus and Tibbœ, growing in Burmah and on the Tenasserim Coast. Three or four are natives of these Provinces, and all afford useful timber, though inferior to the English oak.—*Mason.* No oak nor chesnut ascends above 9000 feet in the interior of Sikkim, where they are replaced by a species of hazel (Corylus); in the North Himalaya, on the other hand, an oak (*Quercus semecarpifolia*, see vol. i. p. 187) is amongst the most alpine trees, and the nut is a different species, more resembling the European. On the outer Sikkim ranges oaks (Q. annulata?) ascend to 10,000 feet, and there is no hazel.—*Hooker Him Jour. Vol.* II, *p.* 114. It is not generally known that oaks are often very tropical plants; not only abounding at low elevations in the mountains, but descending in abundance to the level of the sea. Though almost unknown in Ceylon, the Peninsula of India, tropical Africa, or South America, they abound in the hot valleys of the Eastern Himalaya, East Bengal, Malay Peninsula, and India islands; where perhaps more species grow than in any other part of the world. Such facts as this disturb our preconceived notions of the geographical distribution of the most familiar tribes of plants, and throw great doubt on the conclusion which fossil plants are supposed to indicate.—*Hooker Him. Jour. Vol.* II. *page* 436. Two fine species of evergreen oaks were observed by Fortune in the Himalayas named *Quercu dilatata* and *Q. semicarpifolia.* Amongst herbaceous plants he noticed some pretty primroses *Lilium gigantium* and *Wallichianum*, and *Fritillaria polyphylla.* Here also was the once famous Prangos plant in full bloom.—*Fortune p.* 366. He observed also two specimens of evergreen oak (*Quercus sclerophylla* and *Q. inversa*) with large and glossy leaves, not unlike the Portugal laurel at a distance. Dr. Wight gives i Icones, Quercus acuminata, 221; armata, 770 castanicarpa, 769; fenestrata, 219; ferox, 218 lanceaefolia, 212; lappacea, 220; semiserrata 211; squamata, 213; turbinata, 221.

(6709) QUERCUS ANNULATA, Ring Cupped Oak. Leaves obovate, taper-pointed serrated in their upper half; somewhat glaucou and silky, beneath. Acorns axillary, sessile ovate, with the cup furrowed concentrically Found in the Himalayas.—*Eng. Cyc.*

(6710) QUERCUS BALLOTA. Probabl that described in Persian works as *Shah bulloo* and *Buloot ul mulk.* Ημερις, *Theophr.* A native of Spain and Greece. The acorns of *Q. incana* are sold in the bazars as a medicine, under the name of *Bulloot.—O'Shaughnessy, page* 607. Roxburgh says that a species of oak, *Quercus fenestra,* is a native of the mountains in the vicinity of Silhet; on the Tenasserim Coast the same species grows indigenous not fifty feet above the level of the sea.—*Mason.*

(6711) QUERCUS CASTANEÆFOLIA, the Chestnut-Leaved Oak. Leaves oblong-lanceolate, rather downy on the under side, coarsely serrated, with bristle-pointed lobes. Acorns nearly sessile, oblong, with the cups, when old, covered by reversed scales. A tree from the province of Mazanderan, reported to be very beautiful. The leaves are often from 4 to 5 inches long. Mr. Barker Webb states that it is the same as what has been called *Q. Libani,* and that it is remarkable for having large depressed fruit, with wide lozenge-shaped scales turned back at the point.—*Eng. Cyc.*

(6712) QUERCUS CHINENSIS, the Chinese Oak. Leaves ovate-lanceolate, taper-pointed, with bristly shallow serratures, and very long footstalks; slightly downy on the under side. Acorns globose, sessile, in pairs. Cups with hoary lanceolate scales, the exterior of which are reflexed, and longer than the acorn. A beautiful Chinese species, found (by the botanists attached to the Russian mission to Peking) in mountainous places. It is said to have exactly the habit and appearance of a Spanish chestnut. A figure of it has been given from specimens communicated by Dr. Bunge, its discoverer.—*Eng. Cyc.*

(6713) QUERCUS FAGINEA, Beech-Oak. Leaves on short stalks, obvate, with numerous uniform shallow lobes; downy beneath; when young somewhat heart-shaped and unequal at the base. Fruit sessile. Cup with downy close-pressed somewhat ciliated scales. Acorn conical or somewhat cylindrical. A native of Portugal, Spain, and Tangiers, and apparently unknown in our gardens. Mr. Barker Webb however, who has studied some of the European species with great care, regards it as identical with *Q. Turneri,* or *Q. Australis,* and if so, we possess t. The same learned botanist reduces to this the Aleppo Gall-Nut Oak, *Q. infectoria,* and he s probably right.—*Eng. Cyc.*

(6714) QUERCUS INCANA, the Himalayan Ilex. Leaves coriaceous, ovate-lanceolate, shining and smooth on the upper side, densely downy beneath, with coarse serratures which are not bristle-pointed. Acorns solitary, sessile, acute, but little protruded beyond the hemispherical downy cup, the scales of which are small and closely pressed. A beautiful tree, very like the evergreen oak of Europe. Its leaves are much more woolly on the under side. Dr. Wallich found it in Kumaon, where the people called it 'Munroo;' Dr. Royle states it to be the 'Ban' of the hill people, where he saw it, and that it occurs at moderate elevations. It is therefore in all probability tender.—*Eng. Cyc.*

(6715) QUERCUS INFECTORIA, GALL-NUT OAK.
Galls.
Majoophul, HIND.

Asia Minor, Armenia, and Kurdistan, a shrub 4 to 6 feet high. This tree when punctured by a *cyneps* allows an astringent juice to exude, which becomes the *gall nuts* of commerce.—*O'Shaughnessy, page* 608.

(6716) QUERCUS INFECTORIA, Oriental Gall-Oak. Leaves ovate-oblong, very smooth on both sides, deeply toothed, somewhat sinuated deciduous. Fruit sessile. Cup tesselated. Acorn elongated, nearly cylindrical. A very common plant in Asia Minor, where its branches are attacked by an insect, the *Cynips scriptorum,* which punctures them, and causes the formation of the oak-galls so well known in commerce. It forms a scrubby bush rather than tree, and is of no value except for its galls. Its branches occasionally produce large brownish-red tubercles, spongy within, which are by some supposed to be the apples of the Dead Sea, whose appearance was tempting, but which contained only dust and ashes.—*Eng. Cyc.*

(6717) QUERCUS LANATA, woolly-Leaved Nepaul Oak. Leaves elliptic-oblong, deep green, sharply serrated, coriaceous; densely woolly beneath. Fruit in very short axillary solitary spikes. Cup scaly, without prickles. This is one of the handsomest oaks yet discovered. It is found wild in the Himalayas.—*Eng. Cyc.*

(6718) QUERCUS MANNIFERA, the Manna Oak. Leaves stalked, oblong, somewhat heart-shaped, cut; the lobes blunt, smooth above, downy beneath. Young acorns oval, stalkless, smooth. An inhabitant of the Kurd Mountains, where it was discovered by Mr. Brant, the British consul at Erzerum, who found that the Kurds obtain a sweet mucilaginous substance from its branches and leaves by steeping them in boiling water at the hottest season of the year, and afterwards evaporating the water. This substance is made into cakes, and sold in the markets of the town of Van under the name of Ghiok-Helvashee, 'the Sweetmeat of Heaven.' The species is very near *Q. sessiliflora,* especially a form of it which has been named *Q. Mongholica.—Eng. Cyc.*

(6719) QUERCUS PEDUNCULATA: its bark is used in Medecine.—*Ben. Ph.* 217.

(6720) QUERCUS REGIA, the Royal Oak. Leaves stalked, ovate-lanceolate, heart-shaped, wavy, with coarse sharp unequal serratures, on each side green, shining, and smooth. The lobes of the leaves terminated by a conspicuous bristle. From Kurdistan. It is a noble species, with leaves as large as those of a Spanish chestnut, and very like them.—*Eng. Cyc.*

(6721) QUERCUS RIGIDA, Stiff-Leaved Oak. Leaves oblong, undivided, with spinous serratures, smooth, glaucous beneath, heart-shaped at the base. Footstalks bearded at the summit. Scales of the cup rigid, spreading. A native of Caramania, of Kurdistan, and, according to Sibthorpe, of the Morea, but the last is doubtful. It is a handsome-looking plant, so far as can be judged from dried specimens, but nothing is known of its uses.—*Eng. Cyc.*

(6722) QUERCUS SEMICARPIFOLIA, Marking-Nut-Leaved Oak. Khasrou of the Nepalese, is found in East Nepal, is common as far-west as Cashmere. It is not found in Sikkim, though it appears again in Bhotan. It ascends in the Himalaya to 12,000 feet, which is the highest limit of forest: but in Sikkim no oak attains a greater elevation than 0,000 feet.—*Hooker, Him. Jour. Vol I p.* 187. The quercus semicarpifolia, has Leaves obovate, obtuse, coriaceous, entire; heart-shaped at the base; downy beneath; the young ones with spinous teeth. Acorns solitary or in pairs, on short downy stalks, depressed at the point, about twice as long as the shallow scaly cups. As this species occurs in the Himalayas at the upper limits of the forests, at even greater elevations than the Pines, it would, no doubt, suit the climate of England; and if so, its introduction would be very desirable, for it is stated to form a magnificent tree, whose timber is much esteemed by the natives.—*Eng. Cyc.*

(6723) QUERCUS SERRATA. Amentaceæ.

Shingra, Duc.

These trees are only found in the hill stations, where they have been grown from seed by private individuals. At Mahabuleshwar, a few plants have been grown, more resembling a shrub than a tree.—*Riddell.*

(6724) QUERCUS SUBER Cork-Tree. Leaves ovate-oblong, bluntish, coriaceous, entire or sharply serrated, downy beneath. Bark cracked, fungous. The Cork-Tree is spread through all the warm parts of Spain, but is most abundant in Catalonia and Valencia, whence the principal exports have been made. In the property of forming a spongy soft substance on its bark, it surpasses all other European trees, and hence is of the greatest value for corks and for similar purposes. The form of the tree is said to be much more beautiful than that of the common evergreen oak, and in the districts suited to it, attains a great height. The species bears the climate of London, but acquires little of its natural beauty in that country.—*Eng. Cyc.*

(6725) QUICK LIME.

Ahuk, Arab.
Hunnoo, Cyng.
Chaux, Fr.
Walk, Ger.
Capoor, Mal.
Nurch, Pers.
Iswet, Rus.
Churna. Sans.

Chunam, Chuna, Guz. Hind.
Calcina, Calce, It.
Calcium Lat.
Cal, Sp.
Chunamboo, Tam.
Sunnum, Tel.

The common method of obtaining quick lime, is by the process of burning, in which limestone mixed with wood, coal, or charcoal, is exposed to a strong heat; in this way the carbonic acid is expelled, and the product called *quick-lime* is the result. It is white, of a pale gray tint, opaque, inodorous, and its taste acrid and alkaline. When water is poured upon quick lime it heats, crackles, swells, and a bulky white powder is obtained, called *slaked lime.* Lime is used as a manure, and as an ingredient in mortar. In several metallurgic processes, it is used as a cheap and powerful flux; it is also extensively employed in soap making, leather dressing, dyeing, and medicine, besides many other purposes in common life and the arts. In oriental commerce, the term *Chunam* is applied to quick lime made from calcined shells.—*Faulkner.*

(6726) QUILLS.

Plumes á ecrire, Fr.
Posen, Feder kiel, Ger.
Kulm, Guz Hind.
Penne de scrivre, It.
Stivoli, Rus.
Canones para escribir, Sp.

The hard and strong feathers of the wings of geese, ostriches, turkeys, &c. used in writing.—*Faulkner.*

(6727) QUINCE. Pyrus Cydonia.

(6728) QUINCE SEED.

Behdana, Hub-ul-suffurgul, Arab.
Semen de Coig, Quincunx, Fr.
Quittenkorner, Ger.
Behdana, Guz. Hind.
Melacotogna, It.
Behdana, Pers.
Behdana, Tam.

Are oval, acute seeds, plain at one side, convex at the other, often triangular, truncated at one end, of iron colour externally, and internally white. They abound in mucilage, and are an article of the materia medica. This seed constitutes an important article of commerce in India, being highly valued as a demulcent tonic, and restorative remedy by the Hindoos and Mahomedans all over the East. They are imported into Bombay and Calcutta from the Persian Gulf; and into Northern India they are brought from Cabul and Cashmere.—*Faulkner.*

(6729) QUININE, a vegeto-alkali obtained from yellow bark, as *cinchonia* is from pale bark. [See Bark.] The valuable medicinal properties of the Peruvian barks are due to these vegeto-alkalis. They are associated in the bark with sulphuric and *kinic* acids. Pale bark, or *cinchona condaminea*, contains most cinchona; and yellow bark, or *C. cordifolia*, most quinia. Both are contained in *C. oblongifolia.* There are various methods of preparing cinchonia and quinia. The simplest is to add a slight excess of hydrate of lime to a strong decoction of the ground bark in acidulated water; to wash the precipitate and boil it in alcohol. The solution filtered while hot deposits vegeto-alkali on cooling. When both bases are present they may be separated by converting them into sulphates, the salt of quinia being the less soluble of the two crystallizes first and may be separated. Cinchonia $C_{20} H_{12} NO$, crystallizes in small, brilliant, transparent, four-sided prisms. It dissolves slightly in water, but readily in boiling alcohol; it has little taste, although its salts are excessively bitter. It acts as a powerful base; completely neutralizing acids and forming crystallizable salts. Quinia or quinine $C_{20} H_{12} NO_2$, resembles cinchonia in many particulars: but it does not crystallize so readily: it is more soluble in water and its taste is intensely bitter. Sulphate of quinine, as mentioned under **Bark**, is largely manufactured for medicinal use: it crystallizes in small white needles, and its solubility is increased by the addition of a small quantity of sulphuric acid. The refuse or mother liquor of the quinine manufacturers contains *amorphous quinine*, also called *chinoidine* or *quinoidine*. It is a yellow, or brown resinlike mass, insoluble in water, but freely soluble in alcohol and ether, as also in dilute acids. It is said to be indentical in composition with quinine; if so, it may bear to quinine the same relation that uncrystallizable syrup does to ordinary sugar, it being produced from Quinine by the heat employed in the preparation.—*Tomlinson.*

(6730) QUISQUALIS, a genus of Plants of he natural family of *Combretaceæ*, which is indigenous in Amboyna, Java, and the Malayan peninsula, and extends into India. The genus s characterised by having a very long slender tube of the calyx, which is 5-fid at the mouth. Petals 5, oval, oblong, larger than the teeth of the calyx. Stamens 10, exserted, into the faux of the calyx; the alternate ones shorter. Ovary ovate, oblong, 4-valved Style filiform, obtuse. Drupe dry, 5-angled, 1-seeded. Shrubs with climbing branches. Leaves opposite, seldom alternate, entire, ovate. Spikes axillary and terminal. Flowers change in colour from white to red. The few plants of the genus are cultivated in England with great ease in moist stove-houses in a mixture of loam and peat.—*Eng.Cyc. Quisqualis Indica* is the most common species; its fruit is reckoned a vermifuge.

(6731) QUISQUALIS INDICA.—The Chinese Honey Suckle or Rangoon Creeper. A scandent shrub, with beautiful flowers of various colours, from white to orange and deep red; has a very powerful perfume towards night. It grows from layers, or seed, but the latter are very difficult to find.—*Jaffrey.* In Tenasserim, this elegant scandent shrub is seen trailing its long arms around our bowers and verandahs, buried in thick lively foliage, and gracefully flinging out its thousands of sweet-scented flowers which change their tint from white to rose, and with the clouds at sunset, deepen into richest crimson.—*Mason.* The flowers are scarlet outside and yellowish white within, and hang in large clusters, very useful in covering walls or trellis work, the scent at night is unpleasant to some persons. It is a very common plant in the gardens of the Deccan and may be raised from seed or layers.—*Riddell.*

(6732) QUITCH. [Triticum; Agrostis.]

R.

(6733) RADISH, Raphanus Sativus. Radiula, and oblonga. Lin.

Moolinghie, Tam.
Mara, Guz.
Moollie, Hind. and Duk.
Moolaka, Sans.
Labak, Malay.

Used in salads, the seed pods when young make excellent pickles, raised from seed sown hinly on beds broad cast; require rain water. The red, white, pink and purple turnip varieties ucceed best on the plains, the black spanish *R. niger* is of little value, used in salads.—*Jaffrey.* This vegetable may be sown at the commencement of the rains, either in beds broadcast, or n ridges of beds where other vegetables have een planted, prefer the ridges in the rainy season, as there they grow better. You may continue o sow them until February. The turnip-radishes re of various colours—white, red, spanish black, and purple: also long white, red, and purple. The seed should be trodden in, or beaten down, and then a good watering given to them. When about three inches high, they must be carefully thinned, leaving at least a space of five fingers' breadth between each plant. They take from three to five weeks to come to perfection, and require a good share of watering. The seed pods are often used for pickles when green—*Riddell.*

(6734) RADISH SEED OIL, from Raphanus sativus, was exhibited at the Madras Exhibition of 1855.—*M.E.J.R.*

(6735) RAGGEE. Eleusine coracana.

Ragooloo, Tel.
Kazh vurkoo, Tam.
Ragee, Hind.

(6736) RAGEU. Dr. Hooker's dogs caught a "Rageu," at Choongtam. It is a very remarkable animal, half goat and half deer; the flesh was good and tender, dark-coloured, and lean. It is the "Ragoah," according to Hodgson; but it is not the *Procapra picticaudata* of Tibet.—*Hooker Him. Jour. Vol.* II. *page* 98.

(6737) RAGS.

Lompen, Dut.
Lumpen, Ger.
Stracci, Strazze, It.
Trebje. Rus.
Chiffes, Drapeaux, Drilles, Fr.
Cheudee, Guz. Hind.
Farropos, Trapos, Port.
Trapos, Andrajos, Sp.

Shreds or fragments of old linen, woollen, or cotton cloth. They are of great importance in the arts, being used for various purposes, especially in the manufacture of paper, the greater portion of which is entirely prepared from rags. Rags are sometimes exported from Bombay to London and Liverpool.—*Faulkner.*

(6738) RAFFLESIA. The name of a genus of plants found in the hot damp jungle of Sumatra, growing parasitically on a kind of vine, and discovered by the late Sir T. S Raffles, whose name it bears. It consists of a number of scales investing a fleshy calyx measuring a yard in diameter and containing the organs of fructification within or beneath the rim of a huge fleshy central column. [Rafflesiaceæ.]—*Eng. Cyc.*

(6739) RAFFLESIACEÆ, *Putma-Worts*, a natural order of stemless leafless Parasitical Plants, consisting of flowers growing immediately from the surface of branches, and immersed among scales. The perianth is superior, with a 5-parted limp, thickened processes or calli either distinct or united into a ring being attached to the throat of the tube. The essential organs are combined in a column which adheres to the tube of the perianth. Anthers 2-celled, either distinct and opening by vertical apertures, or combined together so as to become a multicellular mass opening by a common pore. Ovary 1-celled; placentas, parietal. Fruit indehiscent. The species are East Indian and South American plants, parasitic on the species of *Cissus* and on some *Leguminosæ*. There are 16 species. Some of them are said to be styptic. Their perianth has a fungoid appearance.—*Eng. Cyc.*

(6740) RAFFLESIA ARNOLDI, a Sumatra parasite, is capable of containing 12 pints of fluid in its cup. The flower is said sometimes to have a weight of 14 lbs.—*Eng. Cyc.*

(9741) RAFFLESIA PATMA is employed as an astringent and styptic in Java. *R. Horsfieldi*, *R. Cumingi*, and *R. Rochussenii* have similar properties. The genera are *Rafflesia*, *Sapria*, *Brugmansia*, *Apodanthes*, and *Pilostyles*. (Balfour, *Class-book of Botany*; Lindley, *Vegetable Kingdom.*)

(6742) RAIANIA, a genus of Plants so-called in honour of the great naturalist John Ray, is known by the staminiferous flowers having a bell-shaped perianth in six deep oblong pointed segments, most spreading in their upper part.—*Eng. Cyc.*

(6743) RAIANIA HEXAPHYLLA. Six-Leaved Clustered Raiania. Leaves six, on a common stalk, oblong-acute. Flowers racemose. It is a native of the country of Fakonia, in Japan, among bushes, flowering in April. The stem is round, striated, smooth, climbing. The flowers in axillary racemes, clusters snow-white. It differs from *R. quinata* in having mostly six leaflets on a stalk, which are acute, reticulated, with veins at the back; and larger than in that species. The flowers moreover grow in clusters, not in umbels.—*Eng. Cyc.*

(6744) RAIANIA QUINATA, Five-Leaved Umbellate Raiania, has five leaves on a common stalk. It was observed by Thunberg about Nagasaki, and in Japan, flowering in April and May. The stem is twining, round, smooth, ash-coloured; and branched. Leaves several together, axillary, stalked, smooth. Flowers in umbels from the same buds as the leaves, on slender stalks, as long as the footstalks.

(6745) RAIIDÆ or RAIINÆ, a sub-order, or family of Plagiostomous Cartilaginous Fishes, of which the Common Ray is the type. The body of these fishes is horizontally flattened, and more or less discous; the dorsal fins are mostly placed on the tail; a peculiar cartilage, called naso-pectoral, arises from the nasal part of the skull, and extends towards or meets the anterior part of the crest or pectoral fin; the branchial openings are inferior.—*Eng. Cyc.*

(6746) RAIKH-MAI. A fish (sort of eel) found in the sand of rivers, imported dried via Delhie considered aphrodisiac.—*Irvine p.* 150.

(6747) RAIN. The climate of Khasia is remarable for the excessive rain fall. Attention was first drawn to this by Mr. Yule, who stated that in the month of August, 1841, 264 inches fell, or twenty-two feet, and that during five successive days, thirty inches fell in every twenty-four hours! Dr. Thomson and Dr. Hooker also recorded thirty inches in one day and night and during the seven months of his stay, upwards of 500 inches fell, so that the total annual fall perhaps greatly exceeded 600 inches, o fifty feet, which has been registered in succeeding years! From April, 1849, to April, 1850 502 inches (forty-two feet) fell. This unparallelled amount is attributable to the abruptness o the mountains which face the Bay of Bengal from which they are separated by 200 miles of Jheel and Sunderbunds.—*Hooker. Him. Jour. Vol.* II *page* 282.

(6748) RAISINS.

Raisins secs ou passes, Fr.
Rosinen, Ger.
Darakh, Mowage, Guz and Hind.
Uve Passe, It.
Passas, Port.
Isum, Rus.
Pasas, Sp.

Are dried grapes. They are distinguished by the places where produced or exported, as Malaga, Valencia, Persian, Smyrna, &c; or from the variety of grape or mode of preparation, as muscatels, blooms, sultanas, &c.—*Waterston* Raisins, (Monukka: Kishmis: Bedana,) N. W

India, from Istaulik, &c. Vitis vinifera.—*Ben. Phar.* 222. In the south of Europe and in Egypt, &c. grapes are allowed to ripen and dry upon the vine so as to form raisins. The sweet fleshy grapes which grow upon the sunny sheltered slopes of hills are preferred. When the fruit is ripe, the grapes are thinned and the vine is stripped of its leaves. The sun then completes the saccharifications and drives off the superfluous water. When the bunches are plucked they are cleaned, dipped for a few seconds in a boiling lye of wood-ashes and quicklime; the wrinkled fruit is then drained and dried, exposed to the sun upon hurdles for 14 or 15 days. The inest *sun* raisins are the plumpest bunches left fully to ripen upon the vine, after their stalks have been cut half through. An inferior kind of raisins is prepared by drying the grapes in an oven. In the year ending 5th January 1853, 261,824 cwt. of raisins were imported into the United Kingdom, of which quantity 208,801 cwt. were retained for home consumption. The import duty is 15*s.* per cwt. from foreign countries, and 7*s.* 6*d.* per cwt. from British possessions.

(6749) RALLIDÆ, a family of Birds belonging to the *Grallæ* of Linnæus, *Grallatores* of Illiger. The species are commonly called Rails. The species are numerous in South America; some in India; and a few in Africa.

(6750) *Porphyrio.*—Bill short, strong, high; the base dilated into a flat plate on the front of the head; the culmen arched. Nostrils large, basal, covered by a membrane, naked; the aperture terminal and oval. Feet very large. Toes without any lateral membrane. Claws large, slightly curved. (Sw.) There was a quality which was supposed to reside in the *Porphyrio*, which made it both a highly prized and dangerous inmate. The bird was considered as a kind of guard over the women of the house in which it was domiciled: it was believed that it took notice of adultery, and that if the crime was committed, it would give notice to the master of the house by making signs as if it wished to strangle itself. It is to this that the old quatrain alludes in the Portraits d'Oyseaux :—

> " Porphyrion declare l'adultere."
> Fait au logis auquel on l'entretient :
> Car a ces fins tous les semblans ils tient
> De se vouloir estrangier et deffaire."—*Eng. Cyc.*

(6751) *Porphyrio Hyacinthinus.* (*Pollo Sultano*, Savi). Bill fine red; legs and feet fleshy red; irides lake-red; cheeks, throat, sides of the neck, and chest turquoise-blue; remainder of the plumage deep dull indigo blue, having the edges of the greater and lesser coverts of the wings lighter in colour and more brilliant; under tail-coverts white (Gould.)

"Independently of the southern and eastern parts of Europe, the marshes of which are the places of constant resort for this beautiful bird, its range is extended," says Mr. Gould, "over a great portion of Africa to the south, and as far as the mountains of the Himalaya to the east. In Europe it is especially abundant in the Grecian Archipelago, the Levant, and the Ionian Islands; it is less common in Dalmatia and Sardinia. The southern provinces of Hungary and Russia and the borders of the Caspian Sea may also be enumerated among its European localities." M. Temminck states that it is to be seen in many cities of Sicily (where, according to M. Cantraine, it is very common in the neighbourhood of Lentini), that it is not known in Dalmatia nor Calabria, and is rare in Sardinia; and that it is known in Catania under the name of Gallo-Fagiano.

(6752) *Fulica.*—Bill as in the *Porphyrio*, but more slender; the base straight; the gonys short and angulated. Feet very large; the toes margined with a lateral membrane, which is either narrow and of equal breadth or dilated into lobes. The natatorial type. (Sw.)

(6753) *F. atra.* It is the Foulque, Macroule, or Morrelle, of the French; Schwarzes Wasserhuhn of the Germans; Meir Koet of the Netherlanders; Folaga and Folacra of the Italians; Blas-Klacka of the Swedes; Vand-Hoene and Bles-Hoene of the Danes; Jar Ddwfr Foel of the Welsh; and Coot of the English. Some have though that it is the Κέπφος, of Aristotle. It is found throughout Europe, in marshes, lakes, and gulfs; very abundant in Holland and in the lakes of the interior of France, less numerous in Germany and Switzerland. Dr. Von Siebold and M. Burger saw it in Japan.

(6754) *Gallinula.*—Bill short, straight, the margins not inflexed; the cutting edges of the upper mandible folding over the lower. Gonys very short, angulated. Toes simple, without any marginal membrane. The rasorial type. (Sw.)

(6755) *G. chloropus* is the Poule d'Eau of the French; Gallinella of the Italians; Wasserhuhn; Grunfassige Rohrhuhn, and Braune Meerhun, of the Germans; Common Gallinule, Water-Hen, or Moor-Hen of the English; and Dwfriar of the Welsh. This species appears to be not only dispersed over the whole of Europe, but extends its range over the greater portion of Africa and India; and, like the Peregrine Falcon and Barn-Owl, may be said to be universally distributed over the globe. "It is even questioned," says Mr. Gould, "whether those from tropical America, China, and the islands of the Pacific, which exhibit the most trifling marks of difference, should not be considered as identically one and the same species." It was seen by Dr. Von Siebold and M. Burger in Japan; and M. Temminck remarks that the African variety, which is also found in the isles of Sunda, has the anterior border of the wing reddish; the lower tail-coverts, which in European, Asiatic, and Japanese individuals are of pure white or Isabella colour, have a reddish tinge in the variety from Africa and the Sunda Isles which is also somewhat less than European and Japanese birds, and has the frontal plate larger. The variety from the Sunda Isles is, according to M. Temminck, *Gallinula orientalis* of Horsefield, ('Linn. Trans., vol. xiii) The only difference between the Japanese bird and that of Europe is the Isabella tint of the lateral under tail-coverts in the former: in the European variety those feathers are white.—*Eng. Cyc.*

(6756) RAMALINA FURFURACEA. Lichens. Angola weed.—*Simmonds' Coml. Product. p.* 486.

(6757) RAMBEH, the Malay name of a fruit described by Mr. Jack as being common in the peninsula of Malacca, but unknown at Bencoolen, while the Choopa, which is nearly allied to it, is abundant at the latter, but is not found at the former place. The fruit is that of a tree called *Pierardia dulcis*, of the natural order of *Sapindaceæ.* Another species of the same genus is called *P. sapida*, from its also yielding an edible fruit. It is found in the district of Tippera, to the eastward of Calcutta, and also in China, where it is cultivated for its agreeable fruit, according to information obtained by Dr. Roxburgh from Chinese gardeners. It is remarkable that it should there be called Lutqua, as it is called Lutco by the Hindoos on the eastern frontier of Bengal.—*Eng. Cyc.*

(6758) RAMBOOTAN, a Malay fruit, [Sapindaceæ.]

(6759) RAMI TSJINA, *i. e.* "Chinese Rami," a name given by the Malays to the jute; the true hemp; and the urtica nivea.—*Royle.*

(6760) RAMONDIA PYRENAICA. GESNERACEÆ. This is an Alpine plant, growing in a common soil, not likely to thrive here.—*Riddell.*

(6761) RAMPHASTIDÆ, a family of Scansorial Birds known by the common name of Toucans.—*Eng. Cyc.*

(6762) RAMTILLA, a genus of Plants belonging to the natural order *Compositæ* and the sub-tribe *Heliantheæ*, so called from the Indian name Ram-Till, by which the oil of its seed is designated. The plant is remarkable for the number of names by which it has been described by botanists. Of these we need only mention the *Verbesina sativa* of Roxburgh, and the *Ramtilla oleifera* of De Candolle. Cassini had however previously formed it into a new genus, and, under the name of *Guizotia*, "dedicated it to the celebrated historian, then minister of public instruction." This name, being prior to that of *Ramtilla* by a year or two, is now retained as that of the genus. De Candolle, having obtained specimens and seeds from various countries, discovered that the Indian plant was identical with one from Abyssinia, which has been mentioned by Bruce under the name of *Polymnia frondosa.* The fact is interesting in a plant cultivated in both countries for the same purposes, and forming one of the links which indicate the connection which existed in early times between India and Upper Egypt. This plant is cultivated in different parts of India, from October to March, in fields, for the sake of the seed, from which an oil is expressed, and used as a substitute for that of the *Sesamum*, which is considered the best kind. It is used both in dresssing food and as a lamp oil. —*Eng. Cyc.*

(6763) RANDIA (named after Isaac Rand, M D, once a demonstrator of botany at the Chelsea Botanic Gardens), a genus of plants belonging to the natural order *Rubiaceæ.*—*Eng. Cyc.* Randia dumetorum, 580; floribunda, 583; longispina, 582; nutans, 587; uliginosa, 397.

(6764) RANDIA DUMETORUM. Gardenia dumetorum. *Retz.* Posoqueria dumetorum. —*Roxb. Fl. Ind.* i. *p.* 714.

Jooz ul-kueh, Arab. | Muenphul, Hind.

R. dumetorum, the Bush-Randia, is a thorny branching small shrub or tree, with oval leaves, rather blunt, cuneate at the base, and smooth. The flowers are very sweet-scented, sessile, solitary, mostly terminal; the calyx has oblong lobes, rather shorter than the villous corolla. The fruit is smooth, yellow, resembling a small crab-apple, firm and fleshy. The seeds are oval, numerous and lying in mucus. The fruit when bruised and thrown into water intoxicates and even kills fish, which are still however deemed fit for food. Powdered it is deemed a powerful emetic, but this seems an undeserved attribute. The bark of the root is given in infusion as a nauseating remedy. During search for an efficient substitute for ipecachuana, the fruit of this article underwent examination; for specimens the Bengal Committee were indebted to Drs. Wight and Wallich and they found these identical with the *muenphul* of the Bazars. The results of our experiments shew that little or no dependence can be placed on the fruit as an emetic remedy.—*O'Shaughnessy.*

(6765) RANDIA ULIGINOSA, the Bog Randia, has almost terminal opposite thorns, tetragonal branches, oblong leaves somewhat cuneated, glabrous. The flowers solitary, sessile almost terminal. It is a native of the East Indies, in moist places. The flowers are large white, and fragrant, and in twos or threes at the top of the branchlets. The berry is about the size of a pullet's egg, ash-coloured or olive-gray, and 2-celled. The seeds are flattish, nestling in the pulp. The flowers of this species render it deserving of a conspicuous place in the hot-house.

(6766) RANINIDÆ, a tribe of the family *Apterura*, belonging to the section of Anomourous Decapod Crustaceans. This tribe, in its general form and in the conformation of its feet, approaches very closely to the *Hippidæ*, and especially to the *Albuneæ*. [HIPPA.]

Ranina dentata may be taken as an example of the tribe. It inhabits the Indian Seas; Mauritius.

(6767) RANUNCULACEÆ, CROWFOOTS, a atural order of Exogenous Plants. There are bout a thousand known species, of which 1-5th s found in Europe and 1-7th in North America. Ranunculaceæ, are chiefly natives of temperate limates, a few only being found in India ithin 25° north latitude; of these, all but eight r nine are, according to Dr. Wight, natives of he hilly districts. Nearly 100 species have een discovered in the Himalayas. The majory of the Ranunculaceæ contain an acrid principle, volatile at the temperature of boiling water, nd capable of producing inflammation and vesi- ation, if brought in contact with the skin. The aste is stimulating and acrid; if swallowed ther in substance or solution, many of these ants occasion violent purging and vomiting, nking of the pulse, cramps, collapse, and eath. Some contain a powerful narcotic alkali med *Conitiana*, of much value in the treatment rheumatism, and neuralgic diseases. Others e bitter tonics, devoid of poisonous properties, slightly aperient. Lastly, the seeds of one ecies (Nigella) contain a somewhat aromatic sential oil, are valued as a spice, and much ed as a popular stimulation.—*O'Shaughnessy*, *ge* 159. The illustrative genera are—*Aconitum*, ich furnishes Aconite, or Monk's Hood. [ACONI- M.] *Clematis*. [CLEMATIS.] *Coptis* [COPTIS] *elphinium*, the species of which are known as rksspurs. [DELPHINIUM.] *Helleborus*, the ellebore of the ancients, famed as a drastic rge. [HELLEBORUS; PÆONIA] *Nigella*. IGELLA.] *Ranunculus*, Crowfoot, or Butter- p, whence the order is named. [RANUNCULUS, indley, *Vegetable Kingdom*; Balfour, *Class- ok of Botany*.)—*Eng. Cyc.*

This term, *Ranunculus*, is derived from 'rana,' g, because many of the species inhabit humid ces frequented by that reptile. The genus is type of the natural order *Ranunculaceæ*. It s 5 sepals, occasionally 10; with a nectarifer- s excavated scale at the base. The stamens d ovaries are numerous, the achenia ovate, newhat compressed, mucronate, arranged on bose or cylindrical receptacles. The species mostly acrid, and if applied when fresh to skin will produce blisters; this quality is troyed by drying or by heat.—*Eng. Cyc.* ight gives Ranunculus reniformis, 75; subpin- us, 49; and Wallichianus, 937.

(6768) RAPE.—BRASSICA NAPUS. This nt yields the Rape seed of commerce. Used as salad similar to mustard, the leaves are however eaten when the plant is in seed, of no great value as a vegetable, cultivated like Mustard.—*Jaffrey*. This plant is of the Cabbage Tribe, is cultivated like cole, or colza, for the sake of its seeds, from which oil is extracted by grinding and pressure. It is also extensively cultivated in England for the succulent food which its thick and fleshy stem and leaves supply to sheep when other fodder is scarce.—*Eng. Cyc.* For the products of this plant, we refer to the following articles:—

(6769) RAPE-OIL.

Sursee or surrus Teil. GUZ. HIND.

The oil expressed from rape seed, which is extensively consumed in France, and other parts of the Continent for illuminations, &c. This oil is exported from Bombay to England and France.—*Faulkner*. The seeds of *Brassica rapa* and *B. napus* are valuable for the large quantity of oil which they yield by expression. [See OILS and FATS.] *B. rapa* yields the largest quantity of oil. *B. campestris* yields a superior oil known in France as *Colza* oil. Rape-oil is thick, of a yellow colour, and with a peculiar taste and smell; it concretes into a yellow mass at about 28°. Its specific gravity is 0·9167. It is used in the preparation of woollen goods and of some kinds of leather. It is much used in France for burning in lamps. Colza-oil may be used without purification, and it is largely employed in lighthouse lamps in Europe. The common kind of oil is purified by being agitated with a 200th part of sulphuric acid, left to repose for 24 hours, when two-thirds of its bulk of water at 165° are added, and the mixture stirred until it becomes milky. It is then kept for 2 or 3 weeks in a room heated to 80°, when it becomes clear by the deposition of a dark coloured sediment. It is lastly filtered by being drawn off into vats the bottoms of which are pierced with holes stuffed with filaments of carded wool or cotton. Having passed through this filter the oil is fit for use. The acid may be removed by the addition of powdered chalk.—*Tomlinson*.

(6770) RAPE SEED.

Roefero, DAN.	Sursee, Surrus, GUZ. HIND.
Graine de navette, FR.	Shershapa, SANS.
Rapsaat, GER.	

The produce of a hardy biennial plant, of the cabbage tribe (*Brassica rapa*), extensively cultivated in England and on the Continent, on account of its seeds, which are crushed for oil, and partly for its leaves, which are used as food for sheep. In India, it is also extensively cultivated, whence both the seeds and oil are largely exported to England and France.—*Faulkner*.

(6771) RAPE SEED CAKE. Is the adhering masses of the husks of rape seed, after the oil has been expressed. It is employed, like linseed cake, to feed cattle and pigs on the Continent; and as manure in England.—*Faulkner.*

(6772) RAPHANUS, a genus of Plants belonging to the natural order *Cruciferæ.* It is mostly remarkable for containing the common radish, *Raphanus sativus.* This plant, a native of China, has been cultivated in Great Britain for upwards of 250 years, and has given rise to numerous varieties, which are divided into long-rooted or spindle-shaped, and round or turnip-rooted. They are also denominated spring, summer, autumn, or winter radishes, according to the season in which the respective sorts are found best adapted for use.—*Eng. Cyc.*

(6773) RAPHIS. Most of the coir used by the Chinese is made from the bark of the coir palm, (*Raphis flabelliformis*) called, *tsung*, which is stripped off in large sheets from the trunk of the tree; when steeped in water the fibres separate in short wiry threads, of a dark brown color, having all the properties of the cocoanut coir. It is the material from which the cordage in Chinese vessels, and sometimes the cables, is manufactured; brooms, rain cloaks, sandals, hats, brushes for block printing, twine, and other articles are also made from it. The Raphis grows all over southern China, attaining at times the height of 30 feet and upwards; the bark is stripped off every year. The price for the prepared coir is about $ 4 per pecul. Another kind of coir is also in extensive use in the Archipelago for rigging; it is called *gomuti* or *ejoo*, and the thread sells at $ 1.50 or $ 2 per pecul. The best comes from Amboyna.—*Morrison.*

The Ground ratans, the excellent walking-sticks known to the English under this name, are made from the Raphis flabelliformis, which grows in Lin-kiu in Southern China.—*Seeman.*

(6774) RAPHUS, Brisson's name for the Dodo. [DODO.]

(6775) RAPTATORES, the name assigned by Mr. Vigors to the Birds of Prey.

The *Raptores* of Mr. Vigors form his first order, and the following families are arranged by him under it.—VULTURIDÆ, FALCONIDÆ, STRIGIDÆ, *Gypogeranidæ* (?).

The *Raptores* of Mr. Swainson comprise the families of *Vulturidæ*, *Falconidæ* and *Strigidæ.*

Mr. G. R. Gray also makes the *Raptores* consist of the families *Vulturidæ*, *Falconidæ* and *Strigidæ.*

(6776) RAPTORES, Illiger's name for his third order of Birds, comprehending the Birds of Prey.

(6777) RASPBERRY.—Vide RUBUS.

(6778) RATINARIA, a solitary specimen of Lichen, with a fragment of the black extractiv matter, (in a mass) was forwarded from Nellore Illustrations of the practical use of this new dye and a chemical analysis of its constitution ar required to enable the Jury to give an opinion of its value.—*M. E. J. R.*

(6779) RATAN (Calamus).

Rotan, MALAY.
Panjalin, JAVAN.
Kowe, SUNDA.
Bed. HIND.
Betum, TEL.
Piramboo, TAM.

In Malay, rotan, an abbreviation of raotan fron the verb raot, to pare or trim, that is, the objec pared or trimmed. Of this universal product o the forest of the islands, the name, as might b expected, is different in all the different language Thus, in Javanese, it is pánjalin, and in Sund Kowe. The plants which yield ratans are cons dered by botanists as a genus of the family palms, which consists of many species, from th girth of a goose-quill to that of a stout walking stick. They are abundant in all the forests of th Malay and Philippine Archipelagos, and ar every where extensively used as cordage c ligatures, or in the manufacture of mats an basket-work. These singular plants creep alon the ground or climb trees, and, according to th species, to the length of from 100 to 1,200 fee The principal places of production for the genera market are Sumatra, Borneo, and the Peninsul By far the most valuable, probably a distin species, is brought from Banjarmassin on t southern coast of Borneo, for in the market th are worth about 150 per cent. more than an others. A vast quantity of ratans are exporte from the Malay Archipelago to Europe, Hindu tan, and China.—*Crawfurd Dict*: *page* 36 The Rattans of Commerce, though apparently insignificant, form a considerable article of trade so many as four or five millions of them being some years shipped from the territories und the Government of the East India Compan They are products of several genera of palm which all contribute their quota to the gener quantity required in the markets of the East an in Europe. Amongst the plants producing the may be named the genus, Calamosagus, Griffith, with its four species; *C. hariniæfoli* (*Wallichiæfolius*) termed "*Rotang Simote*"; ochriger, "Rotang Donam," with C. scapige and C. lacincosus. The Calamosagi, are a climbing plants.—*Seeman.* Ratan or cane, is us extensively in Burmah and the Tenasserim Pr vinces, instead of Gordage. The stays of the mas in the native boats, are usually made of ratan and they are split up into strings for innume able purposes, to which cord and twine are us ally applied. There are numerous species ind genous in the forests, and the Karens have diffe ent names for seventeen species or varietie Rattans are manufactured by the Chinese in chairs, baskets, and other articles, but their bu interferes with their exportation.—*William*

Middle Kingdom, Vol. II. *page* 402. The est are the produce of Malacca and the astern isles. A coarse description is found in any parts of the Peninsula of India, and there, re used for ordinary purposes, as baskets &c., ey also furnish material for the cables of hakespearian bridges. A coarser description lled country rattans, pedda piramboo, *Tam.* oty beyt, *Hind.* Pedda bettam, *Tel.* grows to a eat length in most districts of the Peninsula. hen green, it is formed into cables for drawing e cars, and in some parts for suspension bridg-. It answers better than bamboo for baskets d for strong fences, when interwoven between akes. The rattan when burnt, yields an or-nary black for paint.—*Rohde. M.S.S.* See ALAMUS.

(6780) RAVENSARA. The article imported to China, from India under this denomination a nut of a dark brown colour, the size of a tmeg, in smell and taste resembling both ves and Pimento: internally it is divided o cells, and contains a kernel extremely hot d biting to the taste, with a strong spicy ell.—Ravensara is, also, however, the name en to the bark of the Clove-Cinnamon tree, wing in the Brazils and Madagascar, of which foregoing is probably the fruit.—*Comp. Descr.*

(6781) REAM. A ream of writing paper sists of 20 quires, of 24 sheets each; and a nter's ream of 21½ quires, or 516 sheets.

(6782) REAUMERIA HYPERICOIDES, s lanceolate flat rather remote leaves. It is native of Syria and Persia. These plants elegant little shrubs of easy culture, which ive well in a mixture of sandy loam and t; and young cuttings will grow freely in d under a hand-glass.—*Eng. Cyc.*

(6783) REAUMERIA VERMICULATA, s subulate semi-terete imbricated leaves, wded on the branches. It is a native of ily, Bombay, and Egypt. This plant resem-s *Salsola fruticosa*. It is used at Alexandria a remedy for the itch, being bruised and lied externally, and a decoction taken in-ally.

6784) REAUMURIACEÆ, *Reaumuriads*, a ural order of Plants belonging to the Exoge-s class. This little order consists of three era, *Reaumuria*, *Hololachna*, and *Eichwaldia*, ch were formerly referred to *Tamaricaceæ*; y have however but little affinity with that er. Their true affinities seem to be with *pericaceæ*, near to which Lindley has placed m. The species are generally natives of the st of the Mediterranean, and of salt plains in milder parts of Northern Asia.—*Eng. Cyc.*

6785) RED LEAD (oxide of), MINIUM, ROMATE OF LEAD.

sreng, ARAB.
inium, FR.
inning, GER.
Minio, IT.
Sindura, SANS.
Vermillion, SP.
Sindoor, GUZ. HIND.
Temmearea, MAL.
Sigapoo Sindooerum, TAM
Sindoorum, TEL.

Is massicot finely ground and calcined. It is a red powder, but with a liability to become black, and is used in painting, in the manufacture of glass, in surgery, &c.—*Waterston.*

(6786) RED SAND. A specimen of the Cape Comorin red sand (a kind of small garnet) may be interesting, and probably useful, (if brought to notice) for polishing gold and silver, as it appears to be much used by the Natives of this country for that purpose. The other specimens of sand from the same locality, are objects of curiosity, the white being rather peculiar, resembling grains of rice. The whole beach to the westward of Cape Comorin, to the extent of several miles, is generally covered at different seasons with red sand; and immediately on the opposite side, to the eastward, almost entirely with black, which is rather remarkable.—*M. C. C.*

(6787) REED, (of which pens are made.)

Peroo naual, TAM.
Baroo, HIND.
Pedda relloo, TEL.

Reeds of the best quality are imported, but inferior descriptions abound on many hills and on the banks of rivers. Reeds for weaving are formed of these, though used also for pens. In Peninsular India, reeds for weavers are constructed by a class of persons, who also practice as oculists, the materials used for reeds are strips of several descriptions of reed: for silk weavers they are made of the fine teeth of the mango fish. —*Rohde M.S.S.*

(6788) REIDLEIA TILIÆFOLIA. BYTTNERIACEÆ. MATHOOREE, *Hind.* A small tree; the young leaves very soft and velvety; flowers small, rose coloured, in axillary and terminal corymbiform panicles, appear in November.—*Riddell.*

(6789) RENNET.

Wfeheh, ARAB.
Pancer Maya, GUZ. HIND. PERS.

The dried contents of the stomach of a calf, used for coagulating or curdling milk.—*Faulkner.*

(6790) REPTILIA, a class of Animals belonging to the sub-kingdom *Vertebrata*, and embracing the creatures usually known as Crocodiles, Lizards, Turtles, Tortoises, Frogs, Toads, and Serpents. These include the AMPHIBIA, CROCODILIDÆ, CHELONIA, OPHIDIA, and SAURIA, and we here propose to give a slight sketch of their history, and the attempts made at their general classificaton. The ancient monuments of the Egyptians prove that the great groups of the tortoises, the lizards, the serpents, and the frogs, as well as their habits, were well known to that people; and the sacred Scriptures abound in passages (the Old Testament especially) showing that a similar knowledge obtained when they were written. Indeed from the earliest times these forms must have attracted the attention of man; and a natural desire on his part to ascertain which of them were dangerous, and which were innocuous, must have led him to particular inquiry in order to solve the doubt. In Herodotus and Athenaeus there are not wanting passages indicative of precise notions respecting many species of reptiles.

The *Amphibia* form, in the last edition of the 'Systema Naturæ,' published by Linnaeus himself, the third class of the animal kingdom. This class consists of three orders:—

1. *Reptiles*, which are described as 'pedati, spirantes ore.'

2. *Serpentes*, which are characterised as 'apodes, spirantes ore.'

3. *Nantes*, which are characterised as 'pinnati: spirantes etiam branchiis lateralibus.'

The last order, which consists of cartilaginous and other fishes, forms no part of our present inquiry, which is confined to animals included in the two first.

The Count Lacépède (1788-90) divided the Reptiles into three great groups:—

1. Oviparous Quadrupeds, subdivided into (1) those which possess a tail, and (2) those which are tailless.

2. Biped Reptiles.

3. Serpents.

In 1799 the method of M. Alexandre Brongniart was read to the French Academy of Sciences, and it seems to have been first published in the 'Bulletin des Sciences,' in 1800; it was afterwards printed among the other Memoirs of the National Institute. His classification may be regarded as a considerable step in advance of those who had preceded him, and had principally confined themselves to external characters, well defined doubtless, but of little moment when compared with those based on organisation and habits. Whilst they carefully attend to the presence or absence of tail or feet, they neglected those essential points which spring from generation and development. Brongniart pointed out the approximation of the Tortoises to the Lizards, and even to the Serpents, and was the first to show that the Toads, Frogs, and Salamanders, ought to constitute a separate order.

M. Brongniart recognised the following orders:—

1. Chelonians (Tortoises).
2. Saurians (Lizards).
3. Ophidians (Serpents.)
4. Batrachians.

The method of Lacépède seems to have found more favour in the eyes of M. Latreille than that of M. Alex. Bronguiart, which last must have been known to the former when he published his 'Natural History of Reptiles,' in 1801. He placed in his first division the Oviparous Quadrupeds, whose body is provided with feet, dividing them into two sections, according as they have unguiculated or clawless toes, and a scaleless skin. His second division is formed by the Serpents; and in his third, designated by the name of Pneumobranchians, he places the genera *Proteus* and *Siren*, as well as another, which he names *Ichthyosaurus* which last is only a Tadpole.

In 1825, when the science had very much advanced, M. Latreille, in his 'Families of the Animal Kingdom,' published another arrangement, which Messrs. Dumeril and Bibron have digested into the following table:—

HEMATRYMES PULMONEES.

CLASSES.	SECTIONS		ORDERS.	FAMILIES.
Reptiles.	Cuirassed.		Chelonians	Cryptopods (*Testudo*, &c). Gymnopods (*Sourochelys*, *Trionyx*, &c.).
			Emydosaurians	Crocodilians (*Crocodiles*, &c.).
	Scaly.	Saurians.	Lacertiform.	Lacertians (*Monitor*, &c.). Iguanians (*Iguana*, &c.). Geckotians (*Gecko*, &c.). Chameleonians (*Chamaleo*, &c.).
			Anguiform.	Tetrapods (*Scincus*, *Seps* *Chalcides*). Dipods (*Bipes*, *Bimanus*). Apods (*Anguis*, *Ophisaurus*, &c.).
		Ophidians.	Idiophids	Amphisbænians (*Amphisbæna*, &c.). Cylindrical (*Tortrix*) Coluberians (*Acrochordus*, *Boa*, *Python*, &c.) Anguivipers (*Bongarus* *Hydrophis*, *Pelamys* &c.). Vipers (*Crotalus*, *Berus*, *Naja*, &c.).
			Batrachophids	Gymnophids (*Cæcilia*).
	Amphilia		Caducibranchians	Anurous (*Pipa*, *Bufo* *Rana*, &c.). Urodeles (*Salamandra* *Triton*, *Axolotl*).
			Perennibranchians	Ichthyoids (*Proteus*, *Siren*).

In the short notice published by George Cuvier in his 'Tableau Elémentaire de l' Histoire Naturelle' (1798), he divided the Reptiles, like Lacépède, into Oviparous Quadrupeds, Serpents, an Biped Reptiles. Oppel (who had been a diligent attendant M. Duméril's course of lectures in 1807 and 1808, and in whose work much of the lessons of the latter are to be traced, as Oppel himself acknowledges, after publishing the 19th volume of the 'Annales du Muséum,' a Memoir on the Ophidians, and anothe on the Batrachians, produced, in 1811 at Munich, his treatise 'Die Ordnungen, Familien und Gattungen der Reptilien, als Prodrom eine Naturgeschichte derselben' (thin 4to.). Th following synoptical table exhibits Oppel's method:—

REPTILIA.	Testudinata		Chelonii. Emydæ.
	Squammata	Saurii	Crocodilini. Geckoides. Iguanoides. Lacertini. Scincoides Chalcidici.
		Ophidii	Anguiformes. Hydri. Crotalini. Viperini. Constrictores. Pseudovipera. Colubrini.
	Nuda	Apoda. Caudata. Ecaudata.	

In 1790 Merrem published a paper in German, with the title of 'Materials for a Natural History of Amphibia,' and in 1820 and 1821 two other papers followed. These papers treat of serpents and several genera of Saurians, and are illustrated with coloured plates. But his system appears to have been published (in 1800) at the suggestion of Bechstein, who had translated Lacepede's 'History of Reptiles' into German; and in 1820 a second edition of this system, which is shown in the following table, made its appearance :—

CLASSES	ORDERS.	TRIBES.	SUBDIVISIONS.
PHOLIDOTA.	*Testudinata*	with feet	Pinniform. Digitated.
	Loricata. (Crocodiles).		
	Squammata	*Gradientia*	*Ascalabotæ.* *Sauræ.* *Chalcidici.*
		Repentia (Anguis Ophisaurus, Acontias).	
		Serpentia	Gulones. { *Innocui.* *Venenati* *Typhlini.*
		Incedentia (Chirotes.)	
		Prendentia (Chamæleon).	
BATRACHIA.		*Apoda* (*Cæcilia*).	
		Salientia (*Rana*, &c).	
		Gradientia with eyelids.	*Mutabilia* (*Salamandra*. &c.).
		Gradientia without eyelids.	*Amphipnuesta* (Hypochton, or Proteus).

M. De Blainville, in 1816, published in the 'Nouveau Bulletin des Sciences de la Societe Philomatique,' the prodromus of his systematic distribution of the animal kingdom, which he produced, in 1822, in his 'Principes d' Anatomie Comparee.' Under the type *Osteozoaria*, and the sub-type *Ovipara* or *Amastozaria*, he places the Reptiles, which he divides into two classes, namely—1, Reptiles or Ornithoid Squamifers; 2, Amphibians or Nudipellifers, Naked Ichthyodians.

The First Class is separated into three orders;—

I. Chelonians, consisting of the genera *Testudo*. *Emys*. *Chelys*. *Trionyx*, *Chelonia*, and *Dermocheys* (Sphargis).

II. Emydosaurians, or Crocodiles, divided into three sub genera.

III. Saurophians, or Bihennians, which are separated into two sub orders :—

A. Surians, consisting of the families of Geckoidians, Agamoidians (the Norma, as *Agama* and *Basiliscus*, and the Anormal, as *Chamæleo* and *Draco*), the Iguanoidians, *Tupinambis*, and the Lacertoidians (divided into Tetrapods, Dipods, and Apods).

B. Ophidians, which are divided into—

1. The Dipods (Chirotes).

2. Apods :—*a* (with numerous teeth). *Pelamys*, *Hydrophis*, the Vipers, and the Lethifers : B (without venomous teeth), the Amphisbænas, the Climbers or Boas, and the Colubers.

The Second Class, Ichthyoid or Nudipelliferous Amphibians, is composed of four orders :—

1. The Batrachians, divided into two suborders—*a* (Aquiparous), *Rana*, &c. ; B (Dorsigerous), *Pipa*.

2. The Pseudosaurians or Salamanders.

3. The Subichthyans, or True Amphibians (*Proteus*, *Siren*).

4. The Pseudophidians (*Cæcilia*).

Dr. John Edward Gray published in 1825 his 'Synopsis of the Genera of Reptiles and Amphibia, in the 'Annals of Philosophy.' He considers the Reptiles, or scaly-skinned group, and the *Amphibia*, or naked-skinned group, as distinct classes.

The class *Reptilia* are thus divided :—

§ I. Body covered with imbedded hard plates ; legs distinct, fit for walking. *Loricata*, Gray, not Merrem.

Order I. *Emydosauri*, De Blainville.

Families.—1, *Crocodotidæ* ; 2, *Ichthyosauridæ* ; 3, *Plesiosauridæ*.

Dr. Gray thinks that *Megalosaurus* of Buckland is perhaps allied to in this order.

Order II. *Sauri*, De Blainville.

Section 1. Tongue not extensile. *Asculabota*, Merrem.

Families : 1, *Stellionidæ* ; 2, *Geckotidæ*.

Section 2. Tongue extensile. *Sauræ*, Merrem.

Families : 3, *Tupinambidæ* ; 4, *Lacertinidæ* ; 5, *Chamæleonidæ*.

Order III. *Saurophidii*, Gray.

Section 1. Body covered with imbricate scales anus transverse, not terminal ; tongue extensile.

Families : 1, *Scincidæ*, Gray ; 2, *Anguidæ*.

Section 2. Body covered with intricate (imbricate ?) scales ; anus terminal.

Family : 3, *Typhlopidæ*, Gray.

Section 3. Body covered with rings of square scales.

Families : 4, *Amphisbænidæ*, Gray ; 5, *Chalcididæ*.

Order IV. *Ophidii*, Brongn. (*Serpentes*, Linn.)

Section 1. Upper jaws with fangs only. *Venati*. (*Venenati* must be meant.)

Families: 1, *Crotalidæ*; 2, *Viperidæ*.

Section 2. Upper jaw with teeth, and with or without fangs; oviparous.

Families: 3, *Hydridæ*; 4, *Colubridæ*; 5, *Boidæ*.

Order V. *Chelonii.* (*Testudinata*, Oppel.)

Section 1. Feet and head retractile into the carapace; carapace solid, covered with horny scales. *Cryptopodi.*

Families: 1, *Testudinidæ*; 2, *Emydidæ*, Bell.

Section 2. Feet and head not or only partly retractile into the carapace; carapace mostly soft. *Gymnopodi.*

Families: 3, *Trionycidæ*; 4, *Sphargidæ*; 5, *Cheloniadæ*.

The following table of the affinity of Reptiles is given by Dr. Gray:—

Normal Groups.	Annectant Groups.
Order I.—*Sauri.*	
1. *Stellionidæ*.	3. *Lacertinidæ*.
2. *Geckotidæ*.	4. *Chamæleonidæ*.
	5. *Tupinambidæ*.
Order II.—*Emydosauri.*	
1. *Crocodilidæ*	3. *Plesiosauridæ*.
2. ———————.	4. *Ichthyosauridæ*.
	5. ———————.
Order III.—*Chelonii.*	
1. *Testudinidæ*.	3. *Trionycidæ*.
2. *Emydidæ*.	4. *Sphargidæ*.
	5. *Carettidæ* (*Chelonidæ?*)
Order IV.—*Ophidii.*	
1. *Crotalidæ*.	3. *Hydridæ*.
2. *Viperidæ*.	4. *Colubridæ*.
	5. *Boidæ*.

Order V.—*Saurophidii.*

1. *Scincidæ*.	3. *Typhlopsidæ*.
2. *Anguidæ*.	4. *Amphisbænidæ*.
	5. *Chalcidæ*.

The 'Neue Classification der Reptilien' of Fitzinger was published at Vienna in 1826. This work, the result of much anatomical and physiological study, has always held a prominent place in the history of Herpetology, and its leading principles will be seen in the following table:—

Class.	Orders.	Tribes.	Families.
Reptilia,	Monopnoa.	I. *Testudinata*, ...	1. Carettoides. 2. Testudinoides. 3. Emydoides. 4. Chelydoides. 5. Trionychoides.
		II. *Loricata*,	6. Ichthyosauroides. 7. Crocodiloides.
		III. *Squammata*, ...	8. Ascalabotoides. 9. Chamæleonides. 10. Pneustoides 11. Draconoides. 12. Agamoides. 13. Cordyloides. 14. Tachydromoides. 15. Ophisauroides. 16. Chalcidoides. 17. Ameivoides. 18. Lacertoides 19. Scincoides. 20. Anguinoides. 21. Amphisbænoides. 22. Typhlopoides. 23. Gymnophthalmoides. 24. Hysioides. 25. Pythonoides 26. Colubroides. 27. Bungaroides. 28. Viperoides. 29. Crotaloides. (Saurians and Ophidians.
		IV. *Nuda*, ...	30. Cæcilioides.
	Dipnoa.	V. *Mutabilia*,	31. Ranoides. 32. Bufonoides. 33. Bombinatoroides. 34. Pipoides. 35. Salamandroides.
		VI. *Immutabilia*, ...	36. Cryptobranchoides 37. Phanerobranchoides.

The following is a synoptical table from the second edition of Cuvier's 'Regne Animal.'

				Orders.						Families.
Heart with an auricle.	Double	Limbs; Jaws ...	Horny, without teeth	Chelonians ...						Chelonians.
			Toothed	Saurians	Feet	Ordinary; toes to the number of.	Five before, four behind			Crocodilians.
							Five to four feet; Tongue	Bifurcated, extensible		Lacertians.
								Not extensible; Body	Ordinary .	Iguanians.
									Flattened .	Geckotians.
								Vermiform, very extensible.		Chameleonians.
						Very short, or to the number of four at least				Scincoidians.
		No limbs	....	Ophidians ...	Skin	Scaly; Eye	With three eyelids			Anguis.
							Without a third eyelid			True Serpents.
						Naked				Naked Serpents.
	Single			Batrachians ...						Batrachians.

Mr. Swainson ('Natural History of Fishes, Amphibians, and Reptiles, in Lardner's 'Cyclopædia') places the *Amphibia* and the *Reptilia* in different classes. He gives the following as "a natural arrangement of the class of *Amphibia*, according to Professor Bell:"—

Order 1. *Amphipneura* (*Amphipneusta?*) *Proteus*, *Siredon*, *Meno-branchus* *Siren* *Pseudobranchus*). Order 2 *Anoura* (Frogs and Toads). Order 3. *Urodela* (*Salamandrina*, *Salamandra*, *Tritonella Molge*). Order 4. *Abranchia* (*Menopoma*, *Amphiuma*). Order 5. *Apodo* (*Cæcilia*). The same author gives the following as a "Synopsis and Natural Arrangement of the Class of Reptilia"

Order 1. *Emydosaures*—Crocodiles (*Crocodilus*, *Champsa*, *Stenosaurus*). Order 2. *Chelonides*—Tortoises (Families: *Chelidridæ*, Crocodile Tortoises; *Testudinidæ*, Land Tortoises; *Emydæ*, River Tortoises; *Triouycidæ*, Soft Tortoises; and *Chelonidæ*, Sea Turtles). Order 3. *Elenosaures* (Enaliosaurs ?)—Fish Lizards (*Plesiosaures*, *Ichthyosaures*, *Saurocephalus*, *Pterodactylus*). Order 4. *Ophides*—the Serpents (Families: *Hydrophidæ*, Water Serpents; *Crotalidæ*, Poisonous Serpents; *Coluberidæ*, Snakes not poisonous; *Anguidæ*, Slow Worms; and *Amphisbænidæ*, Blind-Worms.) Order 5. *Saures*—the Lizards (Families: *Chamæleonidæ*; *Iguanidæ*; Thick-Tonged Lizards; *Lacertidæ*, Slender-Tongued Lizards; *Agamidæ*; and *Scincoidæ*.

In the same year Professor Bell published his interesting 'History of British Reptiles.' He considered the *Reptilia* and *Amphibia* as distinct classes, and justifies his opinion by a reference to their characters, which appear to him to be sufficiently marked and important to warrant their separation. Dr. J.E. Gray has more recently developed his classification in the very valuable British Museum Catalogues. Those devoted to the *Reptilia* are not yet completed. With the exception of the Paris collection, that of the British Museum is more rich in *Reptilia* than any other public or private Museum. Of the Sikkim reptiles which Dr. Hooker procured, seven were *Colubridæ* and innocuous; five *Crotulidæ* were venomous, three of which are new species belonging to the genera *Parias* and *Trimesurus*. Lizards are not abundant, but he found at Choongtam a highly curious one, *Plestiodon Sikkimensis*, Gray; a kind of Skink, whose only allies are two North American congeners; and a species of *Agama* (a chameleon like lizard) which in many important points more resembled an allied American genus han an Asiatic one. The common immense arth worm of Sikkim, *Ichthyophis glutiuosus*, s a native of the Khasia mountains, Singapore, Ceylon and Java. It is a most remarkable act, that whereas seven out of the twelve Sikkim snakes are poisonous, the sixteen species he procured in the Khasia mountains were nnocuous.—*Hooker Him. Jour. Vol.* II. *page* 25. Reptiles, and especially Colubridæ, are very ommon in the Khasia mountains, and Dr. Hooker procured sixteen species, and many specimens. The natives repeatedly assured him that hese were all harmless, and Dr. Gray, who xamined all his snakes, informed him of the remarkable fact alluded to above, that whereas none of these are poisonous, four out of the leven species which Dr. Hooker found in Sikkim are so. One of the Khasia blind worms (a new species) belongs to a truly American genus (*Ophisaurus*), a fact as important as is that of the Sikkim and Agama being also American forms.—*Hooker, Him. Jour. Vol.* II. *page* 3 5.

The following Catalogue of Reptiles inhabiting the Peninsula of India, is by T. C. JERDON, Esq. Madras Medical Service, and enumerates the serpents and frogs of S. India. It is drawn up from his drawings, with a few rough notes attached to them.

(6791) OPHIDIA. VENOMOUS SERPENTS.

Fam. VIPERIDÆ.

Sub-Fam. BUNGARINÆ.

TERRESTRIAL.

(6792) *Elaps Melanurus* (Shaw)—Russell, 1, pl. 8. Dr. Jerdon never procured but one specimen of this little snake. It was at Jalnah and about 14 inches long. It was red beneath the tail and was very bold. Scutæ 234. Scutellæ 28. 13 rows of scales. Common in Burmah.—*Cur. As. Soc.*

(6793) *Elaps Malabaricus*—n. s. Head black with transverse bands, body brown above, with black markings, bright red beneath. Scutæ 246. Scutellæ 38. 13 rows of scales. Tail exceeds $\frac{1}{10}$th of total length. Dr. Jerdon found this little snake in a forest in Malabar, once or twice during the monsoon. The red colour of the abdomen fades in spirits.

(6794) *Bungarus Candidus*—L Russell 1, pl. 1. B. SEMI FASCIATUS, Schl. 'Yenna vyrien' of the Tamools. Up to 3 feet in length. Is very common all over Southern India, and is said to be fatal. Scutæ 217. Scutellæ 39. This snake may be distinguished from one or two harmless species that much resemble it in colour, by the sub-caudal scutellæ being in one row, not double.

(6795) *Bungarus Fasciatus*—Russell 1, pl. 3. Golden banded bungarum. Dr. Jerdon only saw specimens of this handsome snake in the Northern Circars at Ganjam, where it is not very common. It is said to be very deadly.

Sub-Fam. NAJINÆ.—Bon.

(6796) *Hamadryas Ophiophagus*—Cantor ? *Naia Vittata*—Elliot ? Dr. Jerdon once had a magnificent snake of this genus sent him, which had been killed in forest in the Wynaad. It was 12½ feet long. Scutæ 225. Sub-caudal do. 12. Scutellæ 64. He is inclined to think that it may be a different species from the Bengal serpent, for it was of an uniform dark olive colour above, without any appearance of bands. The specimen was unfortunately destroyed. [One, 9 ft. long, which Mr. Bligh, procured about 20 miles S. of Calcutta, and now in the Society's Museum, is banded throughout. *Sankarackur* and *Shakhu-muti*, Beng. *Cur. As. Soc.*

(6797) *Naia Lutesceus*—Russ. 1, pl. 6. Cobra. *Naga Panbu*, or *Nella Pambu*—Tam. But too common all over India.

Sub-Fam. VIPERINÆ,—Bon.

(6798) *Trigonocephalus nepa*—Laur.—*Cophias*

Hypnale—Merrem. Scutæ 142, Scutellæ 39. 17 rows of scales. Not uncommon in forests in Malabar. Dr. Jerdon has not seen it longer than 16 or 17 inches.

(6799) *Trigonocephalus Elliotti.* n. s. Form massive; 23 rows of scales on the body; Scutæ 151; Scutellæ 43. Olive-green above; pearl-white beneath; poison-fangs small; head covered with plates. Up to 2 feet and upwards long. Dr. Jerdon, only procured this on the Neelgherries, towards the lower portion of the plateau. Dr. Cantor tells him that "the shields of the crown of the head resemble those of Trig. blanchotti, Schlegel.

(6800) *Trigonocephalus* (*cophias*) *viridis.* Merrem. Russ. 1, pl. 9. 21 rows of scales, 154 Scutæ. 60 Scutellæ. Rare, Dr. Jerdon only got it from the Eastern Ghats.

(6801) *Trigonocephalus* (*cophias*) *malabaricus.* n. s? Very closely allied to T. nigromarginatus. Has 21 rows of smooth scales. Scutæ 145 to 149. Scutellæ 48 to 53. Green above, with brown transverse and zigzag markings. Up to 2 feet long nearly. Not uncommon in all the forests of the West Coast.

(6802) *Trigonocephalus* (*Cophias*) *Neelgherriensis.* n. s.? Of small size, dark brown with black markings. 23 rows of carinated scales. Scutæ 142. Scutellæ 36. Not uncommon in woods on the Neilgherries.

(6803) *Trigonocephalus* (*Cophias*) *Wardii* – n. s.? Has 21 rows of carinated scales. Scutæ 154. Scutellæ 51. Greenish colour, with purplish-brown diamond spots on back and sides; 12 to 14 inches long. The scales of the head resemble those of T. sumatranus, Raffles, according to Cantor (*in literis.*)

(6804) *Vipera Russellii*—Gray. Russell 1, pl. 7. '*Kunnadi Vyrien*' of Tamools. This well known and justly dreaded snake grows to a large size. Dr. Jerdon is strongly inclined to believe that the far-famed *Cobra monil*, or *Cobra manilla* of some, is merely the young of this species. The old orthography is *manil*, which simply means a chain or necklace, and whoever looks at the markings of this snake, especially of the young one, must be struck with the resemblance thereof to a necklace: both *Cobra capella* and *Cobra monil* are Portuguese names, and little doubt, the latter name was given to our present species by the Portuguese. It has however been forgotten as applied to this viper, and may now be considered a fable; for every one you meet is able, on his own showing, to point you out the *real Cobra monil* as quite distinct, and what is more remarkable, no two observers describe it alike, they only agree in its being a very small and a very deadly snake. He here adds that the *carpet snake*, another household word in the Madras army, appears to him to be equally fabulous, as he has not been able to identify it among the venomous snakes, several prettily marked innocent species having been, at different times pointed out to him as the carpet snake. [Generally, Mr. Bligh thinks the little harmless Lycodon aulicus (as indeed mentioned afterwards by Mr. Jerdon), is known as the Carpet snake and this, perhaps, from its habit of entering houses as much as from its markings.—*Cur. As. Soc.*]

(6805) *Vipera echis*—Schlegel. V. noratta—Shaw. Russell 1, pl. 2. *Kutta cyrien* of the Tamools. This little snake is very common in the Carnatic. Dr. Jerdon does not think its bite would prove fatal to man. He has known a dog bitten by one to recover.

The above are all the venomous land snakes Dr. Jerdon had yet met with in Southern India. Of these the only ones at all common are the Cobra, the Chain Viper (Vipera Russellii), the *Bungarus candidus*, and the little *Vipera echis.* Most of the others are peculiar to the forests of India. The Trigonocephali are not usually fatal. He has known several cases of bites by *Trigonocephalus malabaricus*, and *Trig. nepa*; and none proved fatal. Great pain is experienced, and swelling usually follows, but the patient gradually recovers. He himself was bitten in the forefinger by the *Trigonocephalus neelgherriensis*; He applied a ligature round the finger, and sucked the wound vigorously. In a minute or so the skin round the bite blackened, and in a minute or two more a perfectly circular bit of the skin came off in his mouth. He set off running immediately he was bitten, and felt no further ill effects. See Cantor's remarks on the bite of *Trig. sumatranus*, Journ. As. Soc., Calcutta, XVI, 1044-6; also Blyth, *ibid.* XX, 524.

PELAGIC.

Fam. HYDRIDÆ,—Bon,

(6806) *Hydrophis colubrina*—Schlegel, var.?—n. s. He possesses what is apparently a variety of this species of sea-snake. It differs from the finished drawing of the species in Cuvier's Regne Animal (Edit. des Eleves), in the black markings meeting on the back and abdomen, thus forming a series of light-coloured oval spots on the sides: the abdominal scutæ commence nearer the mouth, having only 3 or 4 series of small scales between them and the elongated mentals; the scutæ are above 300 in number, and the rows of scales are from 35 to 45—whilst in H. colubrina the scutæ are only 246—and the rows of scales 25. My only specimen is a young one procured at Madras.

(6807) *Hydrus schistosus*, Daud.—Russel 2, pl. 10. Up to 4 feet long nearly. Very common at Madras.

(6808) *Hydrus pelamidoides*, Schlegel. Not common at Madras.

(6809) *Hydrus bicolor*, Schneider—Russell 1, pl. 41. Rare at Madras.

(6810) *Hydrus Striatus*, Lacep.—Russell 2, pl. 9 ? Not rare at Madras, up to 6 feet in length.

(6811) *Hydrus nigrocinctus*, Daudin.—Russell 2. pl. 6. Common at Madras.

(6812) *Hydrus Cantori, n. s.*—*H. Nigrocinctus*, var. —Cantor, J. A. S. C. XVI, 1050. Dr. Cantor described this as a variety of the last, in his valuable Catalogue of Malay Reptiles. Dr. Jerdon forwarded him a specimen in 1848, and he remarked as follows on it. "From the examination of this specimen, the second I have seen, I am induced to believe it a distinct species, and not a variety of nigrocinctus." It differs from this last species in the more robust make, larger scales, there being only 21 rows on the body, and larger abdominal scales, especially near the head; also in the shorter triangular head, &c. &c. Dr Jerdon never saw it at Madras, but it is not rare at Tellicherry on the Malabar Coast. Up to 2 feet in length.

(6813) *Hydrus Gracilis*, Shaw—Russell 2, pls. 7 and 8. The number of rows of scales vary from 26 to 35 on the neck, and from 44 to 51 on the trunk. Scutæ 350 to 450. Scutellæ 50 to 60. Very common at Madras. Very remarkable for the small circumference of head and neck compared to that of the body. Up to 4 feet long. All the above sea-snakes are venomous, and their bite to be dreaded.

Fam. BOIDÆ—Boa.

(6814) ACROCHORDUS GRANULATUS, (Schneider)—A. FASCIATUS, Shaw.

Rare—Found sometimes in back-waters.

(6815) *Python molurus*, (L)—*P. Trivittatus*. Schl.—Russell 1, pl. 22. *Boa*, or Rock snake, of Europeans in Madras. Found all over the country. Dr Jerdon has not seen a specimen longer than 19 feet long. This was killed in Travancore, after having swallowed a doe spotted deer.

(6816) *Boa* (*Gongylophis*) *conica*, Schl.—Russell 1, pl. 4. Not rare in the Carnatic and Malabar. It is considered venomous by some of the natives. Has a very malignant aspect. Up to 18 inches long and upwards.

(6817) *Xenopeltis ? trivirgatus*—n. s. Brown above, with a triple series of black marks—beneath white, black-banded; of a shining nacreous lustre throughout. Scutæ 137. Scutellæ 29. 13 rows scales. Dr Jerdon has only found this on the Neilgherries.

(6818) *Tortrix eryx*, Schlegel—var. ? Two-headed snake of many: common. Scutæ 205. Scutellæ 36.

(6819) *Cylindrophis maculatus ? ?* This, Dr. Kelaart has sent to the Society's Museum from Ceylon.—*Cur. As. Soc.*

(6820) *Cylindrophis curticeps.*—n. s. Differs from the last in its shorter, more triangular head, &c. &c.

(6821) *Cylindrophis macroscelis*—n. s. ? Differs from both in the much larger scales. These last three small species are not very common. They are sometimes found on the surface of the ground in rainy weather, but are generally dug out of the earth. They are called earth snakes by the natives.

Fam. TYPHLOPHIDÆ

(6822) *Pilidion ? montanum*—n. s. ? Above bluish-black, yellow on the sides, with a black spot on each of the 3 lower scales; abdomen banded black and white. Scutæ ? Scutellæ 15. 15 rows of scales. 15 inches long. Found only on the Neilgherries.

(6823) *Uropeltis ceylonicus.*

(6824) *Uropeltis affinis*—n. s. Differs from the last in its smaller scales, in the abdominal scutæ being larger, and commencing sooner. They are both rare. Dr. Jerdon procured them on the Western Coast.

(6825) *Onychocephalus acutus*—Dum. et Bibr. Dr. Jerdon possesses one example of this curious reptile, which he procured in the Carnatic at Nellore. Dr. Cantor remarks, "Described from an unique specimen, habitat unknown."

(6826) *Typhlops braminus*, (Daud.)—Russell 1, pl. 43. [This group, the Argyrophis of Mr. Gray, requires to be studied, as several species appear at present to be confounded. The Society's Museum has lately received Typhlops Russelli, Gray, from Chyebasa. *Cur. As. Soc.*] Common under stones in the rainy season, usually called earthworm.

(6827) *Calamaria sagittaria*—Cantor. A specimen sent to Dr. Cantor was so named by him; it had only 170 Scuta and 70 Scutella. It is not rare in forests in Malabar.

(6828) *Coronella tæniolata* 1, pl. 19 ? 15 rows of smooth scales; Scutæ 185. Scutellæ 41. This species is referred to *Tropidonotus stolatus* by Cantor, but a snake that Dr Jerdon possesses and which answers tolerably well to Russell's description and figure, appears to be a true Coronella. It is common at Madras.

(6829) *Xenodon venustum*, n. s. ?—[*X. purpurascens*, Schlegel]. Above olive-brown with a triple series of irregular black spots, the central one edged with pale yellow; some transverse marks on head and neck. Has 17 rows of scales. Scuta 142. Scutellæ 31. Rare—found on the West Coast only; 1 foot long.

(6830) *Xenodon dubium*—n. s. ? Of a pale earthy brown colour, lighter on the side; a series of darker marks, irregular in shape, and edged with black. Scutæ 181. Scutellæ 41. Has 15 rows of scales. Rare. Dr. Jerdon procured it in N. Canara.

(6831) *Lycodon Russellii*—Russell 1, pl. 35. Scutæ 193. Scutellæ 47. 17 rows of smooth scales. Rather common in Southern India.

(6832) *Lycodon aulicus*, (L.)—Russell 1, pls. 16 and 26. Has 17 rows of scales. Dr. Jerdon's specimens have only from 165 to 174 scutæ and from 54 to 61 scutellæ, which correspond with Russell's nearly, viz. from 171 to 174 and 40 to 41, whilst Cantor gives from 208 to 257 and from 57 to 91. One specimen which resembles in colour Cantor's var. B, (Lycodon capucinus, Boie,) does not differ in number of the scutæ, &c. Very common all over the country, often called Carpet Snake and considered dangerous, though of course harmless.

(6833) *Lycodon platurinus*, (Shaw). Scutæ 183. Scutellæ 76. Rare in Southern India—17 rows of scales.

(6834) *Lycodon nympha*—Russell 1, pls. 36 and 37, bad figure. 13 rows of scales ; Scutæ 234. Scutellæ 87—not rare at Madras.

(6835) *Lycodon assimilis*—n. s. Very similar in colour to the two last species, viz. black with white bands. It differs in having 23 rows of scales. Has 190 scutæ and 60 scutellæ. Dr. Jerdon has mislaid the locality of this species.

(6836) *Coluber Blumenbachii*, Schleg.—Russ. 1, pl. 34. *Dhamin* H. ; *Sarray pamboo*, Tam. Perhaps the most common snake in India, grows to a large size, 7 feet and upwards ; frequents chiefly marshy-land, paddy-fields, &c. Scutæ 200. Scutellæ 125—17 rows of scales.

(6837) *Coluber fasciolatus*, Shaw.—Russell 1, pl. 21. Scutæ 200. Scutellæ 58. Not uncommon at Madras and elsewhere in the Carnatic. Dr. Jerdon has seen it nearly 3 feet long.

(6838) *Coluber pictus*, Daud. Russell 1, pl. 29. scutæ 202. Scutellæ 91—Russ.

ARBOREAL.

(6839) *Dipsas trigonata*—Russell 1, pl. 15. *Tati kattaday*, Tel. ; *Peri Surutay*, Tam, Scuta 235. Scutella 83. Common in the Carnatic.

(6840) *Dipsas cynodon* ? Dr. Jerdon's specimens correspond very well with the description in Schlegel. Scutæ 240, Scutellæ 110. Rows of scales 21. Up to — feet and upwards in length. Dr. Jerdon only found this snake in forests on the West Coast.

(6841) *Leptophis pictus*, (Gmel.)—Russ. 1, pl. *Kumberi mukar*, T. ; *Chectooriki pambu*, Tam. 176 scutæ and 140 scutellæ—15 rows of scales. Very common in all parts of the country.

(6842) *Leptophis ? Beltii* ?—n. s. Scutæ 173. Scutellæ 64. Green above, with dark line on the sides bordered on each side by a pale stripe—17 rows of scales. This much resembles the drawing of Ahætula Bellii in Grey and Hardwicke. Dr. Jerdon procured one specimen in a grassy plain at Jalnah. It had killed and was swallowing a small *Vipera echis*.

(6843) *Leptophis ornatus*, Shaw.—Russ. 2, pl. 2 Scutæ 209. Scutellæ 129—17 rows of scales. Dr. Jerdon only procured this very handsome snake lately in Malabar.

(6844) *Leptophis* ? *nilagiricus* ?—n. s. Green above, yellow beneath. Scutæ 140. Scutellæ 73—13 rows of scales. Very common on the grassy hills of the Neilgherries.

(6845 *Leptophis* ! *canarensis* ? Green above, yellowish beneath with a streak on the sides. Scutæ 140. Scutellæ 57—15 rows of scales. Procured in North Canara. Perhaps these two last belong more properly to *Dryinus*. Of the last Dr. Cantor remarks—" Apparently *Dryinus prasinus*, var. A."—the number of the scutæ, &c. however differs very materially.

(6846) *Dryinus nautus*.—Russell 1, pl. 12. Green whip-snake. Scutæ 180 ; Scutellæ 158. Common all over the country. Dr. Jerdon lately saw one that had swallowed a Parroquet and became gorged.

(6847) *Herpetodryas malabaricus*,—n. s. Olive brown with a dark streak along the sides, most conspicuous on the posterior portion of body ; a series of white spots on the anterior portion of the body, edged with black. Scutæ 222 ; Scutellæ 91—25 rows of scales. Dr. Jerdon says it is possible that this may be *H. helena*, as he possesses a young one in which the markings differ somewhat, and much resemble those on Russell's figure, which is evidently a very bad one. [Colubber helena is quite distinct.—*Cur*, *As Soc*.] He procured it in Malabar where it is not very rare.

(6848) *Tropidonotus stolatus*, (L.)—Russell 1, pl. 10 and 11. Scutæ 146 ; Scutellæ 61—19 rows of scales. Seldom exceeds 18 inches in length ; one of the most common snakes in India.

(6849) *Tropidonotus Schistosus*, (Daud.)—Russell 2, pl. 4. Scutæ 140 ; Scutellæ 85—17 rows of scales.

(6850) *Tropidonotus Plumbicolor*, Cantor. The colour of the living snake is leek-green. Scutæ (in a young one) 143 ; Scutellæ 36 ?—21 rows of scales. Found in the Wynaad also in Bundelkund, and about Midnapore.

(6851) *Tropidonotus Monticolus*,—n. s. ? Green, with a series of dark spots on the trunk, one on the centre of back and another on each side, the one on the right somewhat in front, the left one posterior, some white marks on the head ; Scutæ 132 ; Scutellæ 85—19 rows of scales ; eyes large ; 3 feet and upwards in length. Common in the Wynaad, (2 anterior frontals, 3 posterior ditto, lowest scales rhombic).

(6852) *Tropidonotus Piscator*.—Russell, 28 and 33. 19 rows of scales ; Scutæ 139 ; Scutellæ 83. Found in wells and tanks. Very common.

(6853) *Homalopsis rhynchops* (Schneider),—Russell 1, pl. 17. Scutæ 146 ; Scutellæ 65. Common in estuaries.

(6854) *Homalopsis Enhydris*, (Schneider.—Russell 1, pl. 30. Scutæ 150 ; Scutellæ 58. Found in the same localities as the last.

BATRACHIDÆ.

(6855) *Cæcilia Oxyura*,—Dum. and Bibr. Found on the West Coast, but rare.

(6856) *Epicrium Glutinosum,* (L.) Found in Malabar. 2 cirri quite distinct. Probably a distinct species from E. Glutinosum of Ceylon, as sent by Dr. Kelaart. The latter has a strongly marked pale lateral band, and the *cirri* are less developed than they are represented to be in Mr. Jerdon's drawing. Dr. Kelaart, however, obtained a second species, which may be that noticed by Mr. Jerdon; and either may be identical with the *Epicrium* from Assam and from Pinang.—*Cur. As. Soc.*

(6857) *Rana tigrina.* Bull frog. Found all over India.

(6858) *Rana cutipora,*—Dum. and Bibr. In tanks in the Carnatic. Of a beautiful grass green colour, with or without a central yellow stripe on the back.

(6859) *Rana Leschenaultii,*—Dum. and Bibr. The common frog of India.

(6860) *Rana crassa,*—n. s. Of a thick clumsy form, feet webbed to the extremity of the toes; limbs shorter than in R. Leschenaultii, head wider, greenish above with dusky markings. Length 3$\frac{8}{10}$ ths; hind leg 5½. Rare—found in a few tanks in the Carnatic.

(6861) *Rana Malabarica.* Found only on the West Coast, and chiefly during the monsoon when it enters houses, and makes a great gobbling, so much like a turkey that some people call it the 'Turkey frog.'

(6862) *Rana Flavescens,*—n. s. Of a buff colour on the back; yellow on the sides; limbs banded; feet webbed nearly to the extremities. Length of one 3$\frac{2}{10}$ths; hind leg 5½. Of slender nake, pointed muzzle. Found frequenting mountain streams in the forest only.

(6863) *Rana curtipes,*—n. s. Head very wide; muzzle obtuse; limbs rather short; feet webbed to the ends of the toes, except the centre one. Head and back above bright buff; sides deep marroon; legs dark purple with a few white spots; abdomen white mottled. Length of one 2$\frac{9}{10}$ ths; hind leg 4$\frac{1}{10}$th. Found in forest only. Has a very peculiar, rather pleasing call. Chiefly seen during the monson.

(6864) *Rana agricola,*—n. s. Feet not webbed quite to the extremity. Of a greenish colour, mottled with darker. Length of one 2$\frac{1}{10}$th; hind leg 3$\frac{2}{10}$ ths; foot 1. Found in inundated paddy-fields and meadows.

(6865) *Rana Nilagirica,*—n. s. Very much allied to the last, differs in its much longer limbs. Length 2 inches; hind leg 3$\frac{7}{10}$ths. Dr. Jerdon has only seen this frog in marshes in the Wynaad and Neilgherries.

(6866) *Polypedates Leucomystax.* 'Chunam frog' of Europeans. Very common all over India.

(6867) *Polypedates Variabilis,*—n. s. Green frog of the Neilgherries. Green, sometimes unspotted, at other times with gold spots or blackish spots; at times golden yellow with brown spots; at other times brown with darker spots. Length 2½ inches; hind leg 4; foot 1$\frac{2}{10}$ths. Found in the Neilgherries in the banks of streams and in shrubs.

(6868) *Ixalis ? Glandulosa,*—n. s. A small tree frog, with very obtuse muzzle, feet slightly webbed; abdomen largely glandular, tympanum indistinct; green above, yellowish on the sides and limbs. Length 1$\frac{2}{10}$ths; hind leg $\frac{7}{10}$ths; foot 9$\frac{9}{20}$ths.

(6869) *Rhacophorus Reinwardtii,* Dum. and Bibr. Found in the Malabar Coast on trees, and in grass during the monsoon. Not very common.

(6870) *Limnodytes ? Phyllophila,*—n. s. A small frog, with the subdigital disks very slightly dilated; toes not quite completely webbed; tympanum small; reddish yellow, with the sides of the face dark ½ purple. Length 1½; hind leg 1$\frac{8}{10}$ths; foot $\frac{11}{20}$ths. Found in all the Western forests among decayed leaves.

(6871) *Phyllomedusa ? tinniens,*—n. s. Tinkling frog of the Neilgherries. Fingers opposable; feet webbed at base only; yellowish red, or sometimes blackish above; side of head dark; inner fingers yellow; length 1$\frac{1}{10}$th; hind leg 1$\frac{3}{10}$ths. Found in grass and among bushes on the Neilgherries. Has a peculiar loud clear metallic tinkling call.

(6872) *Phyllomedusa ? Wynaadensis.* Somewhat allied to the last, differs in its larger limbs; larger tympanum, &c. Length about 1 inch. In this when the hind leg is drawn forwards, the end of the tibia reaches the muzzle; in the last it only reaches the tympanum; reddish brown above, limbs barred.

(6873) *Polypedates ? saxicola,*—n. s. A small frog with teeth, tympanum distinct, fingers webbed at the base; toes webbed to the extremities; pointed muzzle; dark olive green with dark marbling, and barred limbs. Length 1$\frac{1}{10}$th; hind leg 1¾th; foot $\frac{6}{10}$th; femur and tibia reach beyond the muzzle. Found on rocks in shady mountain streams in Malabar and Wynaad.

(6874) *Hylaedactylus montanus,*—n. s. Mottled green and brown above, Length 1$\frac{7}{10}$th; hind leg 2; foot $\frac{7}{10}$th. Hab. Mountain streams in Wynaad, rare. A very nearly affined species, if not the same, inhabits Mergui.

(6875) *Hylaedactylus carnaticus,*—n. s. Of small size; marbled green and brown; muzzle more acute than in the last species; length 1$\frac{3}{10}$th; hind leg 1$\frac{3}{10}$th; foot 5$\frac{5}{10}$th. Found in the Carnatic during the monsoon, rare.

(6876) *Bufo scaber,* Daudin. Common toad of India. Very abundant.

(6877) *Hyperodon marmoratum.* Found in the Carnatic during the monsoon.

(6878) *Pyxicephalus fodiens,*—n. s. Greenish marbled with brown. Length 2 inches; hind leg 2$\frac{3}{10}$ths; foot $\frac{8}{10}$ths. Found in the Carnatic, burrows in the ground for 1½ feet or so—[Hab. also Ceylon].

(6879) *Pyxicephalus pluvialis,*—n. s. Nearly allied to the last; differs in its shorter thicker form, and shorter limbs; light greenish fawn, with dark marbling. Length of one $2\frac{3}{10}$ths; hind leg $2\frac{4}{10}$ths; feet $\frac{8}{10}$ths. Dr. Jerdon only procured this during the monsoon in the Carnatic. It is very different in appearance, though with so few essential distinctions, and the natives give a distinct name to each.

(6880) *Pyxicephalus rufescens,*—n. s. Of a rufous colour above, whitish beneath; body rough and granulose; limbs barred. Length $1\frac{1}{2}$ inch; hind leg $2\frac{1}{10}$th; foot $\frac{6}{10}$ths. Not rare in gardens on the Malabar Coast.

(6881) *Engystoma ornatum.* Some specimens of this very handsome frog were only once procured by Walter Elliot, Esq. on the Neilgherries. Length $1\frac{4}{10}$th inch.; hind leg $1\frac{6}{10}$ths; foot $\frac{11}{20}$th.

(6882) *Engystoma rubrum,*—n. s. Indian red above; some black marks on the legs. Length $1\frac{1}{10}$th inch; hind leg $1\frac{5}{10}$th; foot $\frac{5}{10}$th. Found in the Carnatic near rivers, in sandy banks. [Also Ceylon.—*Car. As. Soc*].

(6883) *Engystoma malabaricum,*—n. s. Isabella colour above, varied with dark angular markings; sides dark purplish; throat ditto; limbs barred. Length $1\frac{1}{10}$th; hind leg $1\frac{6}{10}$th; foot $\frac{5}{10}$th. Found in Malabar, under stones.

(6884) *Engystoma carnaticum,*—n. s. Nearly allied to the last, differs in the shorter muzzle, shorter hind leg, &c. Length $\frac{9}{10}$ths of an inch; hind leg $1\frac{1}{10}$th; foot $\frac{4}{10}$ths. Found in the Carnatic during the monsoon.—*Jerdon.*

The following notices and descriptions, are by Mr. Blyth, of various Reptiles, new or little known.

(6885) *Calamaria Catenata,* Blyth *n. s.* (*C. monticola*? Cantor, P.Z.S. 1839, p. 50). [" *C. olivaceo fusca, collari, læte flavo, linea dorsali albicante, abdomine citrino. Scut. abd.* 125; *scutel. subcaud.* 44. Hab. Naga Hills."] No anterior frontals: the vertical plate broad, pentagonal, and almost as large as the occipitals: 13 rows of scales: scutæ 187; scutellæ 41 pairs. Predominant colour dusky above, formed by minute black specks upon a pale ground-tint; below pale buff with an iridescent lustre, and marked with lateral series of square black spots chiefly upon alternate scutæ. Four black lines throughout above, the upper bordering a pale medial streak, which is simple upon the tail, but along the body forms a concatenation of elongated oval spots. An imperfect whitish-buff collar, and similar marks before and behind the eye. Length of specimen 17 in., of which tail $2\frac{1}{2}$ in. From Assam. Mr. Robinson. [This and other species sent by Mr. Robinson, we much suspect are from the Khasya hills, or other upland territory.]

(6886) *Calamaria reticulata,* Blyth *n. s.* Vertical plate hexagonal, angulated to the front, and not half so large as the occipitals: supra-orbital and subtriangular. Thirteen rows of scales: large scutæ 136, 138; scutellæ 27, 28 pairs. Colour shining dull black, brilliant and iridescent below: minute yellowish-white specks on the sides of the mouth, throat, and along the sides of the body. In spirit, the edges of the scales are seen to be of a deep black, imparting a reticulated appearance. The larger of two specimens measures 12 in., of which tail $2\frac{5}{8}$ in. From Assam. Mr. Robinson.

(6887) *Calamaria tenuiceps,* Blyth *n. s.* Colour iridescent. black above, yellowish-white below. Nearly affined to C. longiceps, Cantor, but the head anterior to the eyes much less elongated, and the posterior frontals consequently are about as broad as long: vertical plate elongate-hexangular, broadest anteriorly: head conical, narrow; the jaws of equal length. Thirteen rows of scales. Scutae 138; scutellæ 37 pairs. Length of specimen 14 in., of which tail 2 in. From the vicinity of Darjiling. Capt. W. S. Sherwill. The two following species of this genus are remarkable for having the posterior frontals united.

(6888) *Calamaria fusca,* Blyth *n. s.* Of an iridescent dull black colour throughout, the ventrals slightly margined paler. Head small, narrow. Vertical plate pentangular with rounded anterior base, the posterior lateral angles so obtuse in some that the plate might then be described as triangular: occipitals very large, elongated. Thirteen rows of scales. Scutæ 155-7; scutellae 30-34 pairs. Length 15 in., of which tail 2 in. Young obscurely striated with longitudinal rows of pale dots. From Darjiling. Capt. W. S. Sherwell.

(7889) *Calamaria obscuro-striata,* Blyth *n. s.* Much affined to last: the muzzle less obtusely pointed, and the anterior frontals conspicuously smaller. Iridescent brown-black, the under-parts particularly lustrous; obscurely streaked throughout with a pale band occupying the adjoining portions of the fourth and fifth rows of scales on each side, a narrow pale line also along the middle of each of the first three rows, and three similar narrow pale lines along the back, all alternating with dusky lines. Thirteen rows of scales. Scutæ 153-163: scutellæ 49 pairs. Length of the large of two specimens $11\frac{1}{4}$ in., of which tail 2 in. From Rangoon. The next has both the anterior and the posterior frontals, respectively, united or undivided.

(6890) *Calamaria bicolor,* Blyth *n. s.* Dusky-plumbeous above, buffy-white below, throughout; these colours gradually blending, and not abruptly demarcated as in C. tenuiceps. Vertical plate pentangular, broader than long, or forming almost a triangle laterally truncated: nostral large and broad; the muzzle consequently obtuse; and the head broader and flatter than usual in this genus. Seventeen rows of scales. Scutæ 210;

scutellæ 75 pairs. Length of a specimen 19½ in., of which tail 4⅜ in. From Assam. Mr. Robinson.

(6891) *Coronella callicephalus*, Gray, *Ann. M. N. H.*, Dec. 1853, p. 390. [When the above description was taken, we had not seen that by Mr. Gray, which is less detailed.] A beautiful species, with form and scutation of head as in the European Coluber Esculapii (as figured by Schlegel); but the eye somewhat smaller. Nineteen rows of scales: scutæ 201, 211; scutellæ 6, 65 pairs. Colour a light brown, paler below. Head with a median black line over the vertical and occipital scutæ, and another continued from each eye to the first of a series of about 18 semi-annuli, which in the young consist of large and broad white-edged black spots, reaching down to the abdominal scutæ; but in adults the black of the interior of these spots disappears more or less completely, leaving only the pale-margined black edge, so that two narrow black transverse bands remain in place of the single broad black spot of the young: also at about the ninth or tenth of the latter from the head, two narrow black dorsal lines commence, which at first are broken and irregular, but gradually become continuous and well defined towards and upon the tail, where they cross its transverse bands and are continued to the extreme tip. Length of a specimen 27 in., of which tail 4 in. From Assam. Mr. Robinson.

(6892) *Xenodon Purpurascens*, Schlegel. The varieties of colouring of this Snake are extraordinary; even more so than those of Lycodon aulicus. Two adults in spirit from Goalpara are entirely of a pale colour (evidently, however, much blanched), *without traces of markings*. Another, from Assam, is of a dull red-brown above, with narrow black transverse bands; lower-parts reddish-pearly, with two rows of somewhat indistinct black spots, mostly on alternate *scutæ*: head-markings indistinct. A third variety (*Coronella albocincta*, Cantor. *P. Z.* . 1839, p. 50), also from Assam, is of a clay colour, the scales black-margined and sprinkled over with minute black spots, and the entire length marked with about 24 black-edged white semi-annuli; beneath, the black spots are more developed than in the last variety, and are more or less continuous towards the vent: the usual head markings distinct. Two others from Goalpara and Lower Assam, nearly resemble the last, but have no white semi-annuli, nor markings underneath the tail or anterior third of body. Others, again, from various parts, including central [Ammerkantak, towards source of Nerbudda; 700 ft. elevation.] and S. India and Ceylon, also the Tenasserim provinces, have the upper-parts more or less dark, and variously freckled, often with imperfect semi-annuli placed near together, and alternately distinct and comparatively obscure: the under-parts commonly spotless; and sometimes the collar quite black. A single young specimen from Ceylon has 3 rows of black spots continued upon each scuta as far as the vent, where the medial row ceases, and the other two rows are continued to the tip of the tail: above, the black semi-annuli are divided, and the halves placed alternately to the right and left, becoming gradually indistinct upon the hinder half. Upon a first view, this might be considered a distinct species; but we can perceive no structural variation from the rest, and intermediate varieties most probably occur. In all, save the first, the peculiar markings of the head readily indicate the species; as do the rostral and anterior frontal plates from other Indian serpents.

(6893) *Coluber nigromarginatus*, nobis, *n. s.* Nearly allied to C. radiatus, Schlegel, but attaining the size of C. mucosus, (L., v. *Blumenbachii*. Merrem): our largest specimen measuring 7¾ ft. long, of which the tail is 2. ft. 1 in. Colour a bright pea-green (changing in spirit to blue), paler below; each scale of the upper-parts margined with black. Upon the shields of the crown the black margins are extremely slight though present, and they gradually increase in breadth posteriorly until about the middle of the entire length, when the two colours resolve into four black alternating with three narrower blue streaks which are continued to the end of the tail. Eye larger than in C. mucosus, much larger than in C. radiatus. One large superior and one small inferior præ-ocular plate; and a single frænal, the latter as in C. radiatus, to which the present species bears a near approximation in the details of its structure. Sixteen rows of scales, the four median slightly carinated. Scutæ 192-4; scutellæ 126-132 pairs. Hab. Vicinity of Darjiling, where procured by Capt. W. S. Sherwill, who sent with it examples of C. radiates, C. korros, and C. fasciolatus. Dr. Kelaart has also favoured us with C. korros from Ceylon; but the species does not appear to have been hitherto observed in the Indian peninsula.

(6894) *Coluber Prasinus*, Blyth, *n. s.* Wholly green, becoming verditer in spirit; glaucous below and bordering the mouth: 19 rows of slightly carinated scales: scutæ 205, 6; scutellæ 107, 8 pairs. Vertical shield triangular with rounded apex; rather larger than the supra-orbitals, and rather smaller than the occipitals: a single large præ orbitals, and one elongate-oval frænal. Tail suddenly tapering. The larger of two specimens measures 37 in., of which tail 9 in. From Assam. Mr. Robinson.

(6895) *Coluber Hexagonotus* (?), Cantor, [*J. A. S.* XVI, 921.] var. adult. Length 4 ft., of which tail 15½ in.; the latter remarkably slender. Colour brown, paler below; the anterior fourth of the body marked with transverse dusky bands, which become gradually more obscure till they disappear. Seventeen rows of slightly imbricated scales, the median row hexagonal. Vertical plate large, pentagonal, broad to the front. Two præ orbitals, the lower small and bordered by the third and fourth labials; the fourth labial bordering the eye, which is of moderate size; two post-orbitals, and a third or infra-orbital bordering on the fourth, fifth, and sixth labials: nasals large, elongate, the nostril opening in the middle, near the outer border of the anterior frontal; a single small subtriangular frænal. Scutæ 195; scutellæ 144 pairs. Hab. Arakan (Ramri)?

(6896) *Coluber diadema*, Schlegel; *C. Oppellii*, Wagler. This is a little known species; and two examples of it in Calcutta museum (origin uncertain) would not be readily recognised from Russell's plate (II, 30), which would appear to have been taken from an old and remarkably thick individual. One of the Society's specimens is of about equal length to that figured by Russell, but is much more slender; the other is smaller. The markings of the head are very peculiar, as the transverse black band from eye to eye and continued below the eye, and the four black specks on the two occipital plates. Upon the nape is a longitudinal black stripe, followed by a series of black spots along the spine, the first few of them being round, the rest gradually assuming the appearance of short transverse bands, much more regular and placed nearer together than as represented by Russell: towards the tail they diminish in size, and upon it are reduced to a series of minute black specks. Their number, from head to base of tail. amounts to 75. Alternating with the dorsal bands is, on each side, a series of smaller lateral transverse bands, which begin on the sides of the neck as large round black spots, following two oblique streaks behind the eye, and disappear altogether on the tail. They are placed with great regularity; and on the borders of the abdominal scutæ is a further series of black spots. Such as are the markings of our larger specimens, these being of an unmixed black. In our smaller example, all the dorsal black bands have the middle of each scale marked with the pale clay-colour which constitutes the general ground-tint, the lateral streaks are less decided, but the spots on the borders of the scutæ are more so, and every alternate scuta has an additional spot near each lateral margin. There are 19 rows of perfectly smooth (or not carinated imbricated scales. Eye rather large: a great upper and small lower præ-orbital; one large subquadrate frænal; two post-orbitals: and the fifth and sixth labials border the eye below. Scutæ 297-8; scutellæ 98 pairs. Length of our larger specimen $36\frac{1}{2}$ in., of which tail $9\frac{1}{4}$ in.

(6897) *Coluber pictus*, Daudin; *C. Plinii*, Merrem (Russell, I, 29). Of this little known species, Mr. Jerdon has favoured us with a young example, from S. India. It is a true Coluber, and not a variety of Coronella baliodeira, Schlegel, as suspected by Dr. Cantor. [*J. A. S.* XVI, 913.]

(6898) *Herpetodryas helena*, (Daudin). In the Society's museum are two specimens of a Snake, from Darjiling and Rungpore respectively. which may represent a variety of this species. Colour nearly uniform brown above, yellowish-white below with two lateral rows of dusky specks, one speck on each side of every abdominal scuta; a slight dusky streak from behind the eye; a trace of a black V-like mark on the nape; and very obscure indications of body-markings analogous to those of Russell's figure (I, 32) Seventeen rows of carinated scales. The larger of two individuals measures $29\frac{1}{2}$ in., of which the tail occupies 8 in., and head 1 in. Scutæ 189, 199; scutellæ 84, 90.

(6899) *Psammophis condanarius*, Gray (Russell, I, pl. 27; very bad.) Seventeen rows of smooth scales, of which the first row on each side is very broad, the second row less broad, and the rest narrow and lanceolate. General colour bright green above, pale yellow or yellowish white below; longitudinally striped, except more or less towards the head, with four pale bands: the upper occupying the fourth and hal respectively of the third and fifth rows of scales and bounded above and below with a more or less defined narrow black line; the lower occupying the lateral margins of the abdomina scutæ and subcaudal scutellæ, and defined above and below with narrow black lines which are very distinct. A pale superciliary streak bordered with black commences from the nostrils, and another below the eye, occupying the upper hal of the labials. Some also shew an ill-defined pale dorsal streak. Hab. Lower Bengal?

(6900) *Leptophis rubescens*; *Dipsas rubescens* Gray, Hardwicke's *Ill. Ind. Zool.* This seem affined to Dendrophis Rhodopleuron, Schlegel from Amboyna. The areal apertures are remarkably minute and abruptly pierced in the centre of the nasals. Vertical plate narrow. Neck slender. Body much compressed. General aspect of colour reddish-brown, powdered ove throughout, excepting on the chin and throat with minute specks. A row of black spot along the spine. A brown central occipital stripe and similar lateral stripe from nostril to ear Seventeen rows of smooth scales. Scutæ 198; scutellæ 120. From Mergui. Capt. Berdmore

(6901) *Leptophis ornatus*, (Shaw), var. Marked very like young specimens of Coronella Russellii, excepting on the head. Colour olive grown, the upper-parts marked throughou with a regular series of transverse black bars broader towards the head, narrower and becom ing indistinct towards the end of the tail; these black bars set off by whitish edges. Head marked nearly as usual. From Ceylon. Dr Kelaart.

(6902) *Dipsas ferruginea*, Cantor, *P. Z. S.*
1839, p. 53. Head smooth and flat above, remark-
ıbly Frog-like, with somewhat pointed muzzle;
nterior frontals very small; the supra-orbitals
arger than the vertical plate. Canines above
nd below well developed. Tail suddenly ta-
pering. Colour a dull somewhat ferruginous
rown above, a little marked with black and
vhite shewing between the scales; a broad dark
ateral band throughout, and above it an obscure
ale band: lower-parts buffy yellowish-white,
vith a narrow dark lateral band on each side,
nd the rest thickly sprinkled over with minute
lack specks. Head with a narrow black medi-
n line over the frontal and vertical plates, and
nother over the supra-orbital, meeting its oppo-
ite on the occipital and continued to the nape:
lack lines also border the lips and pass through
e eye. Seventeen rows of scales: scutæ 171,
75; scutellæ 56, 64 pairs. Length of one 18¾
., of which tail 3¼ in. From Assam and the
icinity of Darjiling; Mr. Robinson and Capt.
herwill.

(6903) *Dipsas Monticola*, Cantor, *P. Z. S.*
839, p. 53. Affined to *D. Trigonota* in structure.
rown above, pearly-white below, separated by
broad black streak behind the eye: lowermost
w of scales black-bordered for the anterior
ird of the body; and traces of other lines
wards the head. Fifteen rows of scales: scutæ
58, 193; scutellæ 82, 106 pairs. Length of
e 22 in., of which tail 7¼ in. Hab. Assam;
r. Robinson.

(6904) *Dipsas Nigromarginata*, Blyth, *n. s.* Also
fined to D. Trigonota, with median row of
rsal scales broad and hexagonal. No elongat-
 teeth. Colour throughout green above, the
stensible skin black between the scales;
llowish-white below. Twenty-one ranges of
ales; scutæ 252; scutellæ 132 pairs. Length
 one 42 in., of which tail 11 in. Hab. Assam.
r. Robinson.

(6905) *Dipsas Trigonota*, the most common
ecies of India proper, attains to about 6 ft. in
ngth, but is rarely met with so large, and
eys (at least those of medium size) chiefly on
e Calotes versicolor in L. Bengal. Vertical
ield as broad as in the Malayan D. Multima-
lata, not less so as represented in Dr. Schle-
l's plate. The markings are ill represented
 Russell, who figures the young. The very
ung (about 9 in.) are of a pale ashy colour,
th but slight traces of the markings of the
ult; a faint lateral band consisting of three
rallel somewhat darker lines is continued
roughout the length, also a medial and two
eral abdominal lines, besides which the
der-parts are very minutely speckled. There
 a white median frontal streak bordered
th black, continued into a black occipital
reak. When 2 or 3 ft. long, the white
ntal streak is retained, and at the occiput
are two diverging white lines, which converge and meet behind at the first of the series of imperfectly triangular white spots bordered and set off with black, which are continued throughout the body; becoming gradually more ill defined towards and upon the tail. The lower-parts are now pearly-white, a trace only of the lateral abdominal lines appearing as a row of small spots on each side, though not regularly upon every scuta. The full-grown adults is altogether much darker, with the white markings tending to become obsolete; a conspicuous median black stripe is continued over the forehead and occiput, and another proceeds backwards from each eye. Abdomen more or less speckled, with the lines of lateral spots more or less apparent.

(6906) *Tropidonotus zebrinus*, Blyth, *n. s* (*Tr. chrysargos* Schlegel, var. ?) Vertical plate twice as broad as the superciliary, and of same length. One præ-orbital and three postorbitals. Upper-parts (in spirit) deep plumbeous, obscurely spotted with black; the sides and under-parts yellowish-white, the former throughout banded with black, and each band having a whitish spot (probably yellow in the recent specimen) above it. Head plumbeous above, the labial plates with a triangular black spot at the point of junction of each of them above and exhibiting thus two larger spots posterior and two smaller anterior to the eye. Two or three distinct black bands across the nape. Rows of scales 15: scutæ 137; scutellæ 96 pairs. Length of specimen (which is quite young) 10⅜ in., of which the tail measures 8½ in. From Mergui. Capt. Berdmore.

(6907) *Tropidonotus angusticeps*, Blyth, *n. s.* Head narrow, not broader than the neck, little depressed, the eye much larger than in *Tr. subminiatus*, and vertical shield broad. Colour (in spirit) plumbeous above, uniformly spotted with black throughout; below whitish, more or less variegated with black on the hinder half: head without markings; but a V-like mark on the nape with apex towards the occiput, becoming obsolete in adults. One specimen has 4 præ-orbital and 5 post-orbital plates; but in general these number 2 or 3 and 4: and same specimen is remarkable for having no dark markings above, but some indistinct pale spots, probably of a vivid colour on the recent Snake. In an adult the black spots on the upper parts are almost confined to the skin between the scales, and there is no blackish colour on the hinder half underneath. Seventeen rows of scales: scutæ 167, 72; scutellæ 57, 67 pairs. Length of an adult 41 in., of which tail 8½ in. Inhabits Assam and Arakan.

(6908) *Tropidonotus Subminiatus* (?), Schlegel. A most variable species, affined in structure to the preceding. One 16 in. long has the upper-parts speckled over with black and bright yellow on a greenish ground, under-parts whitish throughout. Head plumbeous above: a large black patch behind the occiput, surrounded except in front by orange-yellow border, behind which again the nape is bright vermillion, chiefly between the scales. A conspicuous black streak below the eye, and two black spots posteriorly towards the gape: scutæ 147; scutellæ 94 pairs. Another rather larger, has the back almost plain dark plumbeous, paler and spotted with black towards the nape; lower-parts freckled with minute black specks, and increasingly so to the tail-tip: occiput and nape green, crossed with two orange bands, becoming redder posteriorly. All the upper labials with a black stripe, where each adjoins the next. Scutæ 157; scutellæ 66 pairs. A third, 29 in. long, has the upper-parts dark olive brown, with bright yellow spots on the skin between the scales; the lower dull pearly: nape green, followed by a vermillion space: a single broad black streak below the eye. Scutæ 155; scutellæ 83 pairs. The above three specimens are from Assam. Numerous others from Rungpore and Arakan, are mostly similar to the last, with generally a double black streak below the eye uniting beneath, rarely a single streak, and one large specimen has no streak below the eye: this would seem to disappear with age. Rows of scales 17, 19: scutæ 150, 166; scutellæ 60 to 90 pairs, but generally intermediate. Tail in all suddenly tapering. Largest specimen, which is much thicker than the others (denoting maturity), 3 ft., of which tail 8½ in.

(6909) *Tropidonotus macrops*, Blyth *n.s.* Eye very large; the vertical shield broad, and posterior frontals twice as large as the anterior. Prevailing hue of the upper-parts a dull vinaceous: many of the scales margined with black, and some with yellow: a series of yellow spots (about 50 in number) continued along the spine to the extremity of the tail, with a row of black spots on either side. Head and neck plumbeous diverging on the nape where the first of the series of yellow spots is placed; a slight whitish V-like mark in occiput. Lower parts yellowish-white, with specks and powdering of dusky; more prevalent towards and upon the tail. Seventeen ranges of scales: scutæ 164-6; scutellæ 130-46 pairs Length of largest specimen 31 in., of which tail 6¼ in. Two specimens closely resemble, but a third presents some differences of colour. The row of yellow spots is wanting along the spine, also the dark band on the nape, and the pale V-like occipital mark: the under-parts also are more uniformly whitish. Scutæ 168; scutellæ 124 pairs only. All are from near Darjiling. Capt W. S. Sherwill.

(6910) *Tropidonotus dipsas*, Blyth, *n. s.* Form as in *dipsas*, slender: the neck much compressed. Head oval, flattened above; eyes large; the muzzle anterior to the orbits short: nostrils small, opening quite laterally; the nasal and rostral shields being vertical. General colour plumbeous above, obscurely spotted with black, and two barel traceble lines of whitish spots, more distinct towards and upon the neck where they increase i size towards the head. Occiput black, with an elongated white medial spot, and white V-like mar behind it, the apex of which is prolonged a littl backward. A narrow black line from eye to ey passing in front towards the muzzle; and broad black streak posterior to the eye, continued as series of longish oval spots on the sides of t neck bordering the scutæ. Some black mark also on the upper labials. Under-parts whit throughout, with a row of minute black specks o either side. Rows of scales 17: scutæ 169 scutellæ 90 pairs. Specimen (young) 21½ i long, of which tail 4¼ in. Vicinity of Darjiling Capt. W. S. Sherwill.

(6911) *Tropidonotus Platyceps*, Blyth, *n. s.* beautiful species, with small and flat (but not broa head, having much the aspect of a Herpetodrya [Perhaps H. Frænatus, Gray, (*Ann. M. N. H.* Dec. 1853, p. 390,) may prove to be a variety. Young specimens generally shew the two whi dots on the occipital shields, seen also in Tr UMBRATUS. Frontal and nasal shields vertica Head and upper-parts deep green with slightl black-edged scales; the lower-parts brigl yellow, with a coral-red stripe bordering tl abdominal scutæ on each side, and strong tinging the sides of the body: subcaudal scutell variegated with greenish-dusky, and traces the same about the throat. A white strea bordered with black passes backward from behind the eye and then upward to the occiput, bu this would seem to disappear with age. Suc is (or was) the colouring of two specimens respectively 27 in. long (of which tail 8 in.), an 21½ in. (of which tail 6⅛ in.). But anothe 21½ in. long, is remarkable for having the chi and throat quite black, also the black marking of the dorsal scales more strongly developed tha in the others, and the black marblings of the subcaudal scutellæ are more intense: the later coral-red band is merely indicated; and tl white streak behind the eye is more strong developed and continued forward to the muzzl Number of rows of scales 19: scutæ 174, 86 scutellæ 89, 99 pairs. Another, from Assa appears identical, but has 155 scutæ only; an in spirit appears of a dull olive-green colour, wi two longitudinal pale ruddy dorsal stripes, muc as in Tr. stolatus, and the lower-parts a marked throughout with a black lateral sp on each scuta, seen also in the black-throat specimen. A small young example from tl Khasya hills is similar to that from Assam. Tl three first described are from near Darjiling. Ca W. S. Sherwill.

(6912) *Elaps Personatus*, Blyth, *n. s.* Vertic plate about equal to the posterior frontals supra-orbitals large, subquadrangular, elongat Colour of upper-parts bright red in the adul brown or reddish-brown in the young; marked throughout with from 22 to 28 narrow black semi-annuli, having slight whitish margins: under-parts dull yellowish-white, mottled throughout with black patches more or less developed: head black above, with whitish muzzle and broad cross band posterior to the eyes. Scales lustrous; 3 rows above: scutæ 196, 218; scutellæ 29; 34 pairs. Length of largest specimen 24¼ in.; of which tail 2¾ in. From Assam.

(6913) *Rana Robusta*, Blyth, *n. s.* A moder-tely large Frog from Ceylon. Limbs exceedingly hick and massive; the third-digits fully webbed. Skin subgranulose, especially on the lower-parts. A slight transverse fold on the breast. Colour dusky above, with a large black patch on the back nother on the croup, and smaller lateral patches. Lower parts yellowish-white, with a V-like mark n the lower surface of the thigh in one of two pecimens, both males The same individual has usky spots or imperfect streaks on the lower urface of the thigh, and its posterior surface is marked with longitudinal streaks of alternating black and yellowish-white. Digital membrane peckled with black. Length from snout to vent n., and of hind-limb 4 in., of which the foot s half. Presented by Dr. E. F. Kelaart.

(6914) *Lymnodytes macularius*, Blyth, *n. s.* Differs from L. erythræus by the slightly but istinctly papillose skin of the back, and non-errucose posterior surface of thighs; by its horter and stouter limbs, and short anterior di-its, the two outermost of which have their terminal disks smaller than in L. erythræus. There s a broad black band from nostril to loin, bordered above and below by narrow pale yellow treaks. Entire lower-parts spotless light yellow, as also the upper lip. A black spot at the houlder, and line along the posterior surface of he four-limb. One or more similar lines on the ind-limbs; the thighs beautifully mottled with black; and a black medial line along the back, which becomes double over the loins. Length f male from muzzle to vent 2⅜ in.; of hind-mb 3¾ in.; of which the foot measures 1¾ in. Hab. Ceylon. Dr. E. F. Kelaart.

(6915) *Lymnodytes lividus*, Blyth, *n. s.* A large pecies with short and remarkably fleshy thighs. Colour dusky above, paler and tinged with ruddy n the sides which are spotted with black. Chin, hroat and breast; minutely variegated pale and usky. Belly and thighs underneath, sullied whitish. Above, the thighs and shanks are paler han the back and tinged with ruddy, having several dusky cross-bands. Posterior surface of high smooth or non-verrucose. Length from muzzle to vent 3¼ in., and hind-leg 4½ in., of which the foot is 2¼ in. From Colombo. Dr. E. F. Kelaart.

(6916) *Megalophrys gigas*, Blyth, *n. s.* (Edible Frog of Sikkim, vide *J. A. S.* XXII. 557.) Adult male 4½ in. from snout to vent; hind-foot 7¼ in., of which foot from heel 3⅜ in. Breadth of head 2 in. Interdigital membrane of the hind-foot well developed. Fore-limbs extremely thick, with the skin of their inner surface highly granulose. Upper-parts uniformly dull reddish or purplish-black, a little marked with white on the posterior surface of the thigh: below whitish, much suffused with dusky, and some irregular white spots or marblings along the rami of the lower jaw, and also on the sides of the body and along the sides of the limbs. What appear to be the young have the head proportionally less broad than in the adult, and the upper-parts have more of an olive tinge, and the under-parts are ochreous-yellow, mottled with reddish brown. Hab. Sikkim Himalaya. Capt. W. S. Sherwill. [Two other forms affined to Megalophrys, and like it and Bombinator, exhibiting no external *tympana*, also sent from the Sikkim Himalaya by Capt. Sherwill, we have at present no means of classifying, for want of books of reference.]

(6917) *Bombinator sikimmensis*, Blyth, *n. s.* Size and general character of the European B. igneus. (Laur.), but the hind toes free or slightly webbed only at their extreme base. Male with four large subquadrilateral papillose callosities on the breast, and corresponding callosities on the upper surface of the innermost digits of each fore-foot. The tubercles of the head, body, and limbs, much more developed in males than in females. On the back are four irregular rows of large porous tubercles, and numerous minute tubercles without pores stud the rest of the upper parts. On the hind-limbs small porous tubercles are very regularly disposed. Colour dull livid olive green above, a little banded on the limbs; flame-coloured below more or less marbled with dusky. Presented by Capt. W. S. Sherwill.

(6918) *Homolopsis.* In a collection of snakes from North Carolina presented to the Society by the Rev. F. Fitzerald, through the American Consul, are two fine species of Homolopsis, which do not appear to be described either by Dr. Schlegel, or among the "extralimitals" of New York by M. Dekay, or in other American lists to which we have access. They may, therefore, be here briefly characterized as probably new and underscribed.

(6919) *Homolopsis Reinwardtii*, Schlegel. Form thick and massive, with subtetragonal section; the head broad, subtrigonal, flat, much broader than the neck: body covered with 19 rows of broad, smooth and shining imbricated scales, which on the sides are much larger and broader than upon the back; eyes placed very forward: a single anterior frontal, and series of 7 upper and 9 lower labials. Teeth very minute. Colour black above, yellowish-white below; the sides transversely banded with about 75 bands in all, the black of the back descending and the yellowish-white of the lower parts ascending alternately, and the former continued irregularly across the lower-parts where the two colours are about equally distributed. Head black, irregularly variegated with yellowish-white: the rostral and labials of the latter hue, and all except the last three inferior labials having a medial black spot. Most of the shields of the chin and throat are also thus spotted. Scutæ 200; scutellæ 37 pairs. Length of specimen 4 ft., of which tail 4 in. Head 1⅝ in. in greatest breadth.

(6920) *Homolopsis Parviceps*, Blyth. Form moderately thick, attenuating towards the head, which is small and not broader than the neck; body covered with 19 rows of smooth shining imbricated scales, which on the sides are much broader than upon the back; tail with only 8 rows of hexagonal scales besides the scutellæ. Two anterior frontals, half the size of the posterior. Teeth minute. Colour black above, yellowish-white beneath, the latter extending over 2½ rows of scales on either side. Three yellowish-white dorsal stripes, one median extending from the occiput to the middle of the tail, the others lateral and occupying part of the 5th and 6th rows of scales. On the lower parts, also, two lines are formed of broad black spots, one on either side of each scuta, and along the middle of the body is a third and median row. The shields of the head are margined and variegated with yellowish-white, and each labial except the posterior three lower are whitish having a large black spot. Scutæ 161; scutellæ 45. Length of specimen 2½ ft., of which tail 5½ in.

TORTOISES.

(6921) *Testudo Megalopus*. Since the former part of the foregoing paper was published, the author has had an opportunity of shewing the Society's specimens of Burmese Tortoises to the Rev. J. Mason of Maulmein, who has long devoted considerable attention to the zoology of the Tenasserim provinces. This gentleman immediately recognised the Testudo Megalopus (*J. A. S.* XXII, 640,) as the species with which he was most familiar in Burma: at once distinguishing it from the Indian T. Stellata: and as his judgment is worthy of confidence, we may pretty safely now rank T. Megalopus as a third Burmese species of the genus. At about the same date of publication, appeared a paper by Dr. Gray on some undescribed species of reptiles collected by Dr. Joseph Hooker in the Khasia mountains and Sikkim Himalaya. Among them, his genus

(6922) *Dopasia* approximates Blyth's Ophiseps (*J. A. S.* XXII, 655), but is evidently distinct; the position of the vent in Dopasia is not stated.

(6923) *Parias* maculata, Gray, is identical with Trigonocephalus nilgiriensis, Jerdon, *J. A. S.* XXII, 524, as we find upon comparison of a fine Assamese specimen with the description by Messrs. Jerdon and Gray, and with a coloured figure sent by Mr. Jerdon. Mr. Gray does not give the number of rows of scales or of abdominal or caudal plates. Mr. Jerdon writes—"23 rows of carinated scales. Scutæ 142; scutellæ 36." The Asamese specimen has 23 rows of the first; scutæ 143; scutellæ about 36 pairs. Length 14½ in., of which tail barely 2 in. Colour pale, variegated with dark blackish-edged patches on the upper parts, forming irregular transverse bands, more or less divided and the halves alternating; below whitish, the plates speckled laterally with dusky; chin and sides of throat blackish; a whitish band proceeding backward from the eye, another from mouth, and between them a black space. This Asamese specimen has an elongated black occipital spot, succeeded by two lateral streaks which unite posteriorly; a somewhat different arrangement from that in Mr. Jerdon's drawing, and again different from that exhibited in an example from the vicinity of Darjiling, which also has the under-parts much more mottled with black; but all are evidently identical in species.

Further Notices and Descriptions of various Reptiles, new or little known.—By E. Blyth, Esq

(6924) *Testudo Phayrei*, Blyth. Great Burmese land Tortoise. Carapax smooth, as in T. RADIATA and T. ANGULATA, but much flatter; oblong; subquadrate, its free marginal plates reverted and moderately serrate. Nuchal plat broader than long. Caudal plate *double*. Gular plates longer than broad, moderately notched: anal broader than long, and deeply notched. Beak unemarginate. Fore-limbs covered with very long and thick imbricated scales, much a in a Pangolin; the claws elongate, strong an thick: similar great elongate scales at the heel and a group of five principal obtuse spines o either side of the tail, the medial of them remarkably strong and thick. Two or mo smaller spines or thick elongate scales above th tail. Colour wholly black, or mingled more o less with buff-yellow. In the young, the scale are probably of the latter hue, with gradually increasing black centres. Limbs deep brown; som of the claws yellow in some specimens; the hea and neck paler brown, strongly tinged with yellow Our largest specimen is 20 in. long in a straigh line, or 22½ in. measured over the curve of th carapax, from front of nuchal plate to middle caudal notch: greatest breadth 14½ in. or 20 in. following the curve, from one obtuse later angle to the other. Height 1¼ in. Head to occiput 4½ in. The shell of this individual is whol black, with merely a few slight indications of th ochreous-yellow colouring: all the claws dee brown. Another, rather smaller, has the appearance of great age, with most of the plates its carapax more or less completely unite so that the form of some cannot be trace Colour irregularly mingled black and du buff-yellow; the plastron chiefly black ar

several of the claws are yellow wholly or in part.
Hab. Arakan; Tenasserim Provinces. Speci-
nens presented by Capt. Phayre.

(6925) *Testudo elongata*, Blyth. Small Bur-
nese land Tortoise. Carapax elongate, becom-
ng more so and quite smooth in adults, wherein
t approaches to a semi-cylindrical form; flattish,
ub-even, the three medial vertebral plates
ving almost in a plane, and the free marginals
lightly reverted. Caudal broader than the last
ertebral. Nuchal twice or thrice as long as
road, and even with the borders of the anterior
narginals. Gulars not notched, or but very
ightly so. Caudals divergent from base, and
ransversely elongate-triangular, broader than
ong, forming a slight lateral notch with the
entrals. Beak laterally notched or distinctly
ree-pointed. Scales of the limbs rather small,
ontrasting much with those of the preceding
ecies. Colour of half grown specimen orange-
ellow, each plate having a large black centre,
hich mostly disappears with age, leaving a few
ore or less radiating black spots on those of
e carapax, and often a black spot on only the
rge medial plates of the pastron. Head and
nbs brown, much tinged with yellow. Length
an adult 13 in. in a straight line, by 8 in.
ross, or rather more towards the hinder part
the body. Height 5¼ in. Head to occiput
in. Hab. Arakan. Specimens presented by
pt. Phayre.

According to Dr. Helfer, Tortoises abound
the Tenasserim Provinces, and are much
ten by the Peguers and Karens, who train
gs to search for them.

In India proper and also in Ceylon, only one
ecies of land Tortoise occurs viz.

(6926) *Testudo stellata*, Schweigger, a
ure and interesting notice of which are given
Capt. Hutton in *J. A. S.* VI, 689, under the
pposition of its being T. geometrica. The
ter is a S. African species, very similar to T.
llata, but having a distinct nuchal plate, which
stellata does not possess, and exhibiting cer-
other distinctions. Among some Tortoises,
vever, presented to the Society by Capt. Sher-
l from S. Africa, are two small specimens of
metrica, and one full grown example which
in no way be distinguished from the Indian
llata. The latter does not inhabit Lower
ngal, and is rarely brought alive to Calcutta.
e much more commonly brought there is the
radiata, Shaw, a larger species remarkable for
very hemispherical form, and which is said
e indigenous to Madagascar, in which case
s probably brought to India from the Mauri-
s. The very large specimen referred by Blyth
stellata (v. *actinodes*) in a note to p. 462 *ante*,
now thinks, after much consideration, to be
tinct, and indicates as,

6927) *Testudo Megalopus*, Blyth, *n. s.* Similar
T. stellata, but attaining a much greater size, with proportionally much larger feet and claws. The colours duller and therefore less strongly contrasting, and the lines radiating from each boss of the carapax more numerous. Fore-feet with two large claw-like scales of equal size behind the palm, and no others approaching them in size. Claws of hind-feet fully twice as large as in adult *stellata*. Length of carapax, measured in a straight line, 12 in., by 7½ in. in diameter-breadth. Hab.—?

(6928) *Testudo:* There are several living specimens about Calcutta, of the great Seychelle Tortoise, miscalled T. Indica by Gmelin, and under which Mr. Gray unites no fewer than seven of the supposed species admitted by M. M. Dumeril and Bibron. According to Dr. Schlegel, "The Indian Tortoise [so-called], probably indigenous to Madagascar and the neighbouring isles, has been acclimated in the Gallapagos Isles, in California, and on several other points on the western coast of South America:" but we have been assured, on good authority, that numerous specimens kept in gardens in the Mauritius, have all been brought from the Seychelle Islands in the first instance, that they are still commonly brought from those islands to the Mauritius, and thence we believe the few in India have been imported. It is most assuredly not an Indian reptile, nor have we heard of its ever propagating in this country. [Mr. Blyth adds:—In the Mauritius I am informed that it is eaten. The largest I have seen is in my own possession, alive, and measures 4 ft. 4 in. in length over the curve of the carapax, or 3 ft. 5 in. in a straight line; transversely 4 ft. 2 in. over the high arch of the carapax, or in a diameter line 2 ft. 2 in.: height, when not raised upon the legs, *i. e.* height of shell, 20½ in.; when walking, the shell is lifted fully 6 in. from the ground, if not more: circumference of hind-foot 17½ in. A scientific friend, recently from Jamaica, assures me, that this great Seychelle species is quite distinct from the great Gallapagos Tortoise, which has bred and multiplied in Jamaica and other W. India islands. Curious, that these gigantic land Tortoises (diminutive, however, in comparison with the extinct Indian Colossichelis) should thus be indigenous to small oceanic groups of islands, in each case remarkable for the peculiarities of both their *fauna* and *flora*. We are reminded of the great wingless birds (Dodos and Solitaires) of the Mauritius, Bourbon, and Rodrigues; those also of N. Zealand and of Madagascar; the **Megapodius** of the Nicobars, and its congeners of other islands; the singular and quite recently extinct great Parrot of Philip Islet near Norfolk island, with its sole congener in N. Zealand; the Owl-like nocturnal Cockatoo of N. Zealand, also close upon extirpation, &c. The majority, if not all, of these islands appearing to be remnants of what may be comparatively termed continents, each with its peculiar centre or centres of creation. In all these supposed reliques of ancient lands, with the chief exception of Madagascar, mammalia are rare, and are chiefly or wholly *Cheiroptera*, *Rodentia*, and *Marsupialia*; the two former orders comprising the only placental mammalia of Australia; and one species of each of these placental orders being the only known indigenous mammals of N. Zealand, though a large Badger-like animal has lately been reported in the latter country, in all probability a marsupial. Madagascar is very remarkable for the extraordinary development of the quadrumanous group of Lemurs, among the higher placental mammalia; and has even a rodent Lemur in Cheiromys, as Australia has a rodent marsupial in Phascalomys. Its other placental mammals are mostly of peculiar genera, unknown even on the neighbouring continent of Africa; and no marsupial has been discovered there.]

(6929) *Testudo Horsfieldii.* From Afghanistan Mr. Gray describes a T. Horsfieldi, which he suggests may be T. Iberia, Pallas, *Faun. Casp*, t. 5. The Society's museum possesses a land Tortoise from that country, which however belongs to the genus Homopus, having but four claws to each foot. It may be thus described, viz.;

(6930) *Homopus Burnesii*, Blyth. Carapax squarish, depressed, broadest posteriorly, where the free marginals are a little reverted and distinctly serrate. Anterior border straight, the nuchal plate well developed. Caudal as broad as the last vertebral, and broader than the other vertebral plates. Nucleus of each lateral or discoidal plate near its inner or upper border. Gular plates longer than broad, the two forming a nearly equilateral triangle. Anals oblong, divergent, forming a rather deeply notched border. Scales of forelimbs rather large, and those to the front mostly uniform in size. Claws elongate, or not worn down by attrition. Beak three-pointed. Colour yellow above, with black nuclei to the plates: those of the plastron black, with yellow border. The head and limbs appear to have been yellowish. Length of carapax 6 in., by 5¼ in., measuring straight. Height 2⅞ in. Head to occiput 1½ in. This large specimen was procured in Afghanistan by Sir A. Burnes. A very small Homopus in spirit, also from Afghanistan, is doubtless the young, though exhibiting some remarkable differences in the shape of the upper plates. In this the nuchal is roundish, or as broad as long; and all the vertebrals are about equally broad. Colour dull yellow throughout. Presented to the museum by TERRAPIUS. Dr. Allan Webb.

Of the numerous true Terrapins (*Emys*) of the Gangetic rivers, only three species are common in the vicinity of Calcutta; and adults of all are rarely met with. These are —

(6931) *Emys Thurgii* Gray, which attains to a much larger size than has hitherto been described, adults measuring 20 to 22 in. (straight) in length of carapax.

(6932) *Emys Tectum*, Gray, the adults of which measure similarly 6 in.; and E. Hamiltonii, Gray, the adults of which measure similarly 5½ in.

(6933) *Emys Tentoria.* The only other species we have yet met with from this vicinity is E. Tentoria, Gray, one young specimen only. This Mr. Gray describes from the Bombay Dukun; where procured by Col. Sykes and Sir Alexander Burnes obtained an adult from the Indus, which is now in the Society's museum. These two specimens differ in some respects from each other, also from Mr Gray's description, and from Buchanan Hamilton's coloured figure; the two latter agai presenting certain discrepancies one from th other. The species is nearly affined to E. Tectum, Bell; but at all ages has the median keel to the first three vertebral plates much les developed, and the whole carapax is conspicuously flatter and broader. A peculiarity o both species consists in the peculiar decanter shaped form of the fourth vertebral plate. Comparing the adult of E. Tentoria from the Indu (length of carapax, measured straight, 6¾ in., with an adult of E. Tectum from the Hughl (carapax, similarly measured, 6 in.), the firs vertebral plate is proportionally much broader i the former, pentagonal, narrower to the front with a broad straight transverse base posteriorl and the keel little developed; whereas the firs vertebral plate of E. Tectum is pentagona broader to the front, with a rounded posterio base, and much more developed keel. In th former, the first vertebral is considerably large and somewhat broader than the second, wherea in the latter it is sub-equal or even rather smalle than the second: in adult E. Tentoria th second vertebral plate is hexagonal but almo square, and rather broader than long, with th keel nearly obsolete; in E. Tectum, somewhat pear-shaped, truncate to the front an narrowing and curving off posteriorly, with th keel strongly marked: the third vertebral plat of adult Tentoria is quadrangular, longer b half than broad, with the keel quite obsolete o the anterior half, and flat and but little raise posteriorly; in E. tectum it is hexagonal, with th keel strongly developed and prolonged backwar A narrow black line is continued along the spin ridge of E. tentoria; wherras the middle of th ridge is broadly white in E. tectum, bordered b a black line on either side. The plastron E. tentoria is blackish-brown, with a pale bo der to each plate; in E. tectum pale with tw or three distinct blackish patches on each plat Comparing the young of the two species, th first vertebral plate forms a much broad pentagon in E. tentoria, being equal in breadth to the second; in young E. tectum the first vertebral plate is considerably narrower than the second: the second vertebral plate in young tentoria forms a heptagon with the base posteriorly; in young tectum a pentagon with rounded apex and anterior base: the third in young tentoria is subquadrilateral, somewhat longer than broad with the keel a little produced posteriorly; in young tectum a pentagon with its base to the front, and the keel much broader and more prominent. Yet, notwithstanding these great differences of detail, nd also of the colouring of the head, neck, and imbs, the two species are very liable to be confounded on a superficial glance.

(6934) *Emys Trijuga*, According to M.M. Dumeril and Bibron, Schweigger, was obtained y M. Duvancel from the "salt-water lake" ying east of Calcutta; but of the numbers of Terrapins which we have seen from that locality, ve have sought in vain for this species, which elongs to the peninsula of India, and is the only ne which has been there observed, with the exeption of Col. Sykes's specimen of E. Tentoria.

(6935) *Emys Dhongoka*. [Since the above was rinted, we have obtained another Emys, from he vicinity of Chaibasa, which appears to be the oung of E. dhongoka; and Mr. Jerdon assures ne that a large species abounds in the Nerudda, 2 feet and upwards, which is probably he same: it is not referred to in Mr. Jerdon's aper, p. 463 *ante*.]

(6936) *Emys Sebæ*. In Ceyon E. Dhongoka s replaced by the very distinct E. sebæ, Gray.

(6937) *Emys Dhongoka*. On the Arakan coast, dults of Emys Dhongoka, Gray, approaching to feet in length of carapax, would appear to be ery common; but the only young specimen which e have seen of this species was sent down alive rom Assam by Major Jenkins, and is now ounted in Calcutta museum. The adults have uch the appearance of Tetraonyx Lessonii, D. nd B., but are readily distinguished by having ve instead of four claws to the fore-feet.

(6938) *Tetraonyx Lessonii* abounds at the outh of the Hughly, and great numbers are rought to Calcutta, where they are eaten y particular castes of Hindus and are even ept for sale in tanks. Though the waterortoises generally are much used as food, the pecies chiefly consumed, or at least which are rought in greatest quantity for that purpose, re Tetraonyx Lessonii and Emyda punctata. he latter appears to be the most generally difused species of Tortoise throughout the whole f India and Ceylon, and is very abundant in ower Bengal, burrowing deep into the beds f tanks when the water dries up. A large one hich escaped into the Bengal Asiatic Society's ompound was found several months afterwards in a healthy state, buried among the roots of some guinea grass.

A small and evidently young Emys from Arakan or Tenasserim would seem to be

(6939) *Emys ocellata*, Dumeril and Bibron. The colouring agrees with the description; the details of structure less completely. Length of carapax 6 in. (measured straight). It is affined to *E. Thurgii*; and, as compared with a specimen of *E. Thurgii* of the same size, it is at once distinguished by having the whole under surface of the shell spotless yellowish-white, and each lateral or discoidal plate of the carapax is marked in the centre with a large round reddish-brown spot, surrounded by a pale areola; an interrupted black line along the spinal ridge, which is raised into keels on the first four vertebral plates. These are of equal breadth, whereas in *E. Thurgii* the first is much narrower than the others. Nuchal plate twice as long as broad and throughout equal; whereas in *E. Thurgii* it is triangular with posterior base. Hindmost vertebral plate much narrower than in *E. Thurgii*; and the posterior marginals and especially the caudals are much smaller than in that species. Colour of the upper parts greenish olive-brown, with the ocelli before mentioned, which probably become obscured with age. Head brown above, with yellow superciliary line meeting its opposite over the nostrils, and another proceeding backward from the eye. Limbs and under parts apparently yellowish without markings. There is a species of Chameleon in the Society's old collection, the origin of which is unknown, but it would appear to be undescribed. It would seem to be most nearly allied to C. cucullatus, Gray, and has the occipital flaps of both that species and Ch. delepis, Leach.

(6940) *Chameleo verrucosus*, Blyth. Body minutely tuberculated, with larger tubercles regularly intrespersed throughout. The latter are smaller and contrast less strongly on the limbs and tail, and are more thickly set upon the limbs. Ridges of the back and throat serrated, the tubercles becoming smaller towards and upon the tail. Beneath, the tail is smooth, though tending to exhibit a slight serrature towards its base. Superciliary ridges not uniting together, either before or behind; and a small medial occipital ridge continued to the base of the two lateral flaps or lappets of skin. Colour of the specimen blanched; but there is a strongly marked black streak proceeding backward from the axilla, and surmounted by a white streak, the two occupying the space which may be concealed behind the humerus. Length 11¾ in., of which the tail is 6 in. Hab. unknown.

(6941) *Leiurus Berdmorei*, Blyth (*Geckoidæ*.) Agrees with Mr. Gray's definition of *Leiurus*, except that there is no appearance of the toes being webbed at base. Colour grey, with 4 longitudinal blackish streaks along the back and sides, 3 or 4 interrupted crossbands of the same on the upper surface of the tail, a medial black streak on the nape, and others successively diverging on each side of it, and a black streak from before the eye continued to the shoulder. Some mottling also on the limbs. Hab. Mergui, where procured by Capt. Berdmore.

(6942) *Stellio.* The genus *Stellio* is new to the Indian fauna. A species from Upper Hindustan cannot be safely separated from the Arabian *St. Cyanogaster*, Ruppell, unless upon comparison of specimens. The tail, however, appears to be longer; and there is a slight gular *fanon.* Specimens vary much in colour. An adult from Mirzapore, presented by the late Major Wroughton, measures 12½ in. long, of which the tail is 8 in. Throat blue, spotted over with yellowish-white, deepening to purple on the *fanon* which is less spotted. The rest of the lower parts are yellowish-white, marbled on the transverse fold of the neck and immediately behind it with blackish, and spotted with the same on the breast and belly, the spots becoming less numerous on the latter. Upper parts dark olive-green the back and sides speckled over with whitish. Two smaller specimens were presented to the Society by L C Stewart, Esq. now of H. M. 61st Regt. from Wuzeerabad. Length of one 8¾ in., of which the tail measures 5½ in. In these the under parts are yellowish-white, suffused or marbled with bluish or pale dusky on the throat, and slightly spotted with the same on the breast. Upper parts paler olive-green than in the large specimen; the back and sides speckled with yellowish-white in one, as in the adult example, with traces of dusky marbling on the back; in the other, the back is much more marbled and blotched with dusky, and has only a few largish dull white spots on the back and sides, while the limbs and tail are banded, and there are three dark transverse lines over each eye. If new, it will be the St. indicus, Blyth.

(6943) Genus *Calotes*, Kaup. We have now nine well marked species of this genus in the calcutta museum. The first three are distinguished by a pit or fold before the shoulder, which is lined with minute scales.

.(6944) *Calotes. emma*, Gray (vide "Proceedings of the Asiatic Society" for May, 1853, p. 413.) Inhabits Mergui, and probably other parts of Burma, ranging northward perhaps to the Khasya hills; but extremely doubtful as an inhabitant of Afghanistan. We have elsewhere expressed our suspicion (*loc. cit.*) that collections made by the late Dr. Griffith in Afghanistan and in the Khasya hills had become mixed and confounded, and hence that Mr. Gray had been led to assign his Calotes emma, C. maria, C. minor, and Salea Horsfieldi to Afghanistan, and two of the four to the Khasyas also; countries so extremely different, that it is most inprobable that the same species would be found to inhabit both of them.

(6945) *Calotes mystaceus*, Dumeril and Bibron. (Described *J. A. S.* XXI, 754). Inhabits Burma, and also the mountainous parts of Ceylon. Hind-toe reaching to the ear.

(6946) *Calotes Rouxi* (?), Dumeril and Bibron. Three adult specimens and another half-grown forwarded by Dr. Kelaart from Newera Elia, in Ceylon, accord fully with the description as regards structure; but the colouring is remarkable, and different again from that of Mr. Jerdon's supposed C. Rouxi of S. India. Pit before the shoulder more developed than in C. Mystaceus, and partially black. Hind-toe reaching to the eye. A row of 3 or 4 raised spines above the tympanum; and nuchal crest moderate and gradually diminishing to the tail. The latter is tumid at base, and soon attenuates rather suddenly, the tumid portion exhibiting a median ridge of very broad keeled scales. Caudal scales towards the base of tail much larger than those of the body. Throat scales very broad and flat, with a median row of narrow compressed scales imparting the appearance of a small *fanon* or dewlap. A half grown specimen (in spirit) is blue, with the tail reddish-brown to near its base, and marked with an irregular double series of *ocelli* which are white, having a black border. A few similar *ocelli* are seen bordering the low spinal crest. There is a black mark between the eye and the ear, and another below the eye; and a tinge of ruddy on the throat, about the tympanum, and on the occipital and tympanic spines. Adults (in spirit) have the body and limbs blue, the tumid base of tail green, and the rest of the tail dull red-brown, with *ocelli* less bright than in the young. Borders of lips black, continued as a broad black band (more or less variegated with ruddy-white) to the shoulder-pit. Throat whitish tinged with ruddy and strongly contrasting, as also a white band from the tympanum continued over and passing the shoulder-pit. In some, the shoulder pit is also posteriorly margined with a white mark; and raising the fore-leg, two or three additional white stripes are seen, oblique and successively more inclining to the horizontal. The limbs are also banded with white; but these markings are often indistinct or obsolete. Tumid base of tail bright orange underneath in some specimens. C. Rouxi is described from Burma; but as we possess the preceding species both from Burmah and the mountains of Ceylon, it is the less improbable that the present may have the same habitat.

(6947) *Calotes. Gigas*, Blyth, (Supposed C. ophiomachus, *J. A. S.* XI, 870). Resemble C. versicolor, except in being much larger, having no tract of gular *fanon*, and a *double* nuchal crest of spine-like scales, ½ in. long in the specimen under examination. Dorsal crest also proportionally more developed than in C. versicolor, and terminating abruptly over base of tail. Length of head and body $5\frac{3}{4}$ in. Of tail—? Of hind-limb $3\frac{3}{4}$ in. Colour apparently uniform without markings, but the specimen is much blanched. Hab.—?.

(6948) *Calotes versicolor*, Daudin. The most common and generally diffused species, inhabiting all India and Ceylon, from the base of the Himalaya southward, and (according to Mr. Gray) also China and Afghanistan (vide, however, remarks on C. emma). It is the only species we have in Lower Bengal, where it is excessively abundant particularly in gardens. Sir A. Burnes sent a specimen from Sindh; and we have also one from Rangoon. In the last, however, the scales are somewhat smaller than in Indian specimens, and the two detached spines on the tympanic ridge are remarkably minute; but there is no other difference. Ceylon specimens, on the other hand, appear commonly to attain a greater size, with somewhat larger scales, the nuchal and dorsal crests and also the gular *fanon* being rather more developed (and they are then the supposed C. Rouxi *apud* Blyth of *J. A. S.* XXI, 354); but smaller and younger specimens from Ceylon are quite undistinguishable from Bengal examples; and it may even be that the latter sometimes attain the size and general development of the Ceylon reptile. [Some *living* examples sent from Galle by Dr. Kelaart are quite undistinguishable from iving Bengal specimens.] In S. India, again, the changes of colouring (as described by Mr. Jerdon) differ from those of C. versicolor of Bengal, and are perhaps the same as in the Ceylon animal. Here the colours are changeable, but no yellow is ever seen; and in the months of May and June, the males chiefly are often observed with the head and anterior third of the body, inclusive also of the fore-limbs, tolerably bright red, a large black patch before the shoulder, and all the rest plain greenish-brown. They are often altogether of the latter hue without markings; or the markings come out more or less trongly. The reptile is then commonly brown, ighter or darker, with a series of transverse dusky bands, broken on either side by a longitudinal whitish band which is evanescent, appearing and disappearing and sometimes shewing very conpicuously. A dusky streak through the eye, and hree others radiating below and two above it. Three or four oblique streaks on each side of the hroat; and others on the limbs. Females are maller and darker, generally of the hue of the ground on which they lie.

(6949) *Calotes viridis*, Gray. Nuchal crest exremely slight; and no decided spines above the ympanum, but three raised angular scales placed not on a ridge, but disposed triangularly and eparated apart. In some specimens, probably he females, the latter are scarcely noticeable. There is also a row of five flattened scales from below the eye to above the tympanum. Two longest hind-toes of subequal length and reaching only to the ear. Body scales acutely pointed, especially those of the lower parts. Colours green or brown, mottled with whitish and with dark brown; lips black. From S. India.

(6950) *Calotes ophiomachus*, (Merrem). Tympanic ridge with several short and two longer spines. Longest hind-toe reaching to front of eye. Tail extremely long, its terminal three-fourths commonly whitish. General colour green, paler below; with some irregular white transverse bands on the body in adults. Stripe through the eye red; and nuchal crest and throat the same in the breeding livery of the males. One Ceylon example (in spirit) is remarkable for having a longitudinal white lateral band, continued from the shoulder to the tail upon which it becomes broken and lost. Identical from S. India, Ceylon, and the Nicobar Islands.

(6951) *Calotes platyceps*, Blyth. *J. A. S.* XXI 354. Hab. Khasia hills.

(6952) *Calotes tricarinatus* Blyth. Founded on a young specimen of a well marked species, affined by the flat form of the head to the last, but particularly distinguished by having three low crests or keels along the nape and shoulders. An oblique row of six large triangular scales over each tympanum, but no spines (perhaps on account of youth). Longest hind-toe reaching to tip of muzzle. Colour (in spirit) blue above, white beneath. From near Darjiling, where procured by Capt. Sherwill.

(6953) *Aspris*, Blyth, *n. g.* (*Scincidæ*). Affined to Tropidophorus, *Dumeril* and *Bibron*, but differs much in the arrangement of shields upon the head, and the face anterior to the eyes is compresssed and narrow, with subacute muzzle. Tongue very slightly notched. Teeth extremely minute. Frontal shield elongate-pentangular, attenuating much posteriorly: front-parietals triangular and contiguous; parietals large, subovate; interparietal smaller, elongate and obtusely pentangular; superciliaries five in number, broad, the two series separated apart by the narrow hinder part of the elongated frontal shield. Scales of the back and upper part of tail rhombic, strongly carinate, the keels running in parallel ridges; of the belly roundish, smooth. Præ-anal scales 2, large, triangular. Toes 5—5, simple, slender.

(6954) *Aspris Berdmorei*, Blyth, *n. s.* Colour dusky-brown or blackish, the throat and belly ruddy-white, with some cross-bands of the same upon the neck and body, broader and more distinct on the former, and white specks on the lips, chin, and on the under and laterial surface of the tail. Eight distinct rows of keeled scales along the back. Length of specimen $4\frac{5}{8}$ in., of which the tail is $2\frac{3}{8}$ in., and head $\frac{9}{16}$ in., fore-limbs $\frac{8}{16}$ in.; hind-limbs $\frac{13}{16}$ in. Hab. Mergui, where procured by Capt. Berdmore.

(6955) *Mocoa formosa*, Blyth, *n. s.* Length of one 7 in., of which the tail measures half. Scales hexagonal, in six dorsal series. Præ-anal scales similar to the abdominal. Form robust. Frontal shield elongate-pentagonal, broadest to the front, and rounded posteriorly. Inter-nasal and fronti-nasals lozenge-shaped, or somewhat fan-shaped, broader than long. Fronti-parietals distinct, but unsymmetrically divided. Colour olive-green, with black lateral and pale superlateral bands as usual, the former much speckled with greenish-white, and the latter shewing a series of black spots. Between the pale superlateral streaks are five narrow black lines along the nape and body, variegated with angular greenish-white spots. A few such spots appear also on the upper surface of the tail, caused by a scale variegated with black and greenish-white here and there placed. Limbs minutely pencilled with black, and spots or streaks of the same upon the head. Under-parts greenish-plumbeous throughout. This large specimen was procured at Mirzapore by the late Major Wroughton; and others, from Wuzeerabad, presented by L. C. Stewart, Esq. now of H. M. 61st Regt., are smaller and less marked with black, which does not form continuous lines along the back, but variegated scales (black. with pale medial portion,) are throughout scattered, and there are some black markings on the head.

(6956) *Mocoa Sikimmensis*, Blyth. *n. s.* A small species, about 4 in. long. the tail varying in length in different individuals. In one the head and body measure $1\frac{5}{8}$ in., the tail $2\frac{3}{8}$ in.; in another the head and body measure $1\frac{3}{4}$ in., the tail but 2 in. This difference is probably sexual, the former proportions denoting the male, and the latter the female. [The same variation occurs in the species of Riopa, Gray.] Closely affined to the preceding species, but much smaller, flatter, and more lustrous, with proportionally much more slender toes. Colour of the upper parts nacreous olive-green, with three irregular black lines or rows of specks along the back, not always very conspicuous. A broad black lateral band, becoming obsolete along the sides of the tail, is margined with a glistening pale greenish stripe above, and variegated with spots of the same along its lower half and on the outside of the limbs. Under-parts greenish-white, except the tail and below the limbs where the colour is rufous-white. Some have a few dark spots on the throat. Inhabits Sikim, where procured by Capt. W. S. Sherwill.

(6957) *Plestiodon Quadrilineatum*, Blyth, *n. s.* Proportions of Tiliqua; the head small, but its plates almost exactly as in Pl. Laticeps of N. America. Colour blackish above, pearly white below; two dorsal greenish-white streaks, commencing at the nostrils and gradually disappearing at about the middle of the tail; these streaks being exterior of the two alternating series of medial and hexagonal dorsal scales; also a lateral pale streak from fore to hind limb, which is more or less indicated on the neck and base of tail, close upon the whitish hue of the under-parts. Length $7\frac{1}{2}$ in., of which the tail measures $4\frac{3}{4}$ in.; of hind-limb $\frac{15}{16}$ in. China (Hong Kong?). J. C. Bowring, Esq.

(6958) *Euprepes macularius*, Blyth, *n. s.* Affined to Eu. cyanogaster. (Lesson, v. *Eu sechellensis*, D. & B.) Like Tiliqua rufescens, (Shaw), but the scales of the upper-parts 5-7 carinate, and colour bronzed olive-green above, pale below; the hinder half of back and base of tail above marked with irregular reddish-brown spots, and a broad reddish-brown lateral streak continued from the ear to the middle of the tail, marked throughout with white, which tends to form continuous lines posteriorly. Terminal half of tail whitish. Arms and hind-limbs speckled with white posteriorly. Length of specimen $5\frac{1}{4}$ in., of which the tail measures $3\frac{1}{2}$ in. Inhabits Rungpore?

(6959) *Lissonota*, Blyth, *n. g.* Form of Euprepes, but more slender, covered with very smootl minute uncarinated scales. Head short, flat, subtriangular as viewed from above, broader tha high, with obtusely pointed muzzle. Tympanu distinct, roundish. Lower eyelid scaly. Palata incision slight, placed far back. Tongue scarcel notched. Teeth very minute. Frontal shiel pentagonal, subtriangular, broad to the front; an elongated to an obtuse point posteriorly; th supra-orbitals nearly meeting across. Inter-nasa hexangular, somewhat fan-shaped. Fronti-nasal small. Fronti-parietals two, contiguous. Inter parietal squarish or diamond-shaped. Limbs wel developed. Toes 5-5, the palms and the heel (or exterior portion of soles) granular. Infra caudal scales larger than those of the body; an two large triangular præ-anal scales.

(6960) *L. maculata*, [This species would seem affined to *Plestiodon sinensis*, Gray.] Blyth, *n. s* Colour (in spirit) greyish olive-green, with double row of irregular dark spots along the nap and back, and a median line of the same alon the tail. On each side a dark band is continue throughout, commencing at the nostrils; and be neath this is a narrow pale streak, then a narro dark one, and finally a few dark spots on th sides of the throat and belly. Upper surface o the limbs variegated throughout. Lower-part albescent-greenish. Length of specimen,—hea and body $1\frac{7}{8}$ in., and tail probably about the same but the tip is wanting. Fore-limbs $\frac{5}{8}$ in.; hin limbs $\frac{15}{16}$ in.: distance apart of fore and hin limbs 1 in. From Assam, Col. Jenkins.

(6961) *Ophiops Jerdoni*, Blyth, *n. s.* A typi cal species, dark bronze above, black-spotted with two obscure broad dorsal streaks; belo white throughout. Length of head and body 1 in. ; of tail $2\frac{1}{4}$ in. ; of hind-limb, to extremity of longest toe, $\frac{3}{4}$ in. Femoral pores 7 or 8. Shields of head plaited longitudinally. "Procured at Mhow, in pasture land." T. C. Jerdon, Esq. [Since Mr. Jerdon's paper on the reptiles of S. Indian was ready for publication. With reference to that paper, p. 468 *ante*, he desires me to state that "the only specimen of Homonota fasciata was taken from the mouth of a snake, in grassy land, near Jaulnah."]

(6962) *Sphenocephalus*, Blyth, *n. s.* A *Sepsoid* form affined to Sphenops, Wagler, but with more slender and elongated shape, and the limbs placed nore distantly apart ; the anterior minute and itting into a groove, the posterior as large as in Sphenops, and each having but three toes, of vhich the innermost and next are subequal and he outer much shorter. [It is still more nearly ffined to the Australian form Ronia of Gray, igured in the Appendix to Grey's Journal ; but his has still more rudimentary limbs, the anterior nerely indicated externally, and the posterior hewing but two digits.] Form slender, $\frac{2}{3}$ cylindri-al, quite flat and laterally angulated beneath as ar as the vent : the body and tail covered with mall, smooth, lustrous, hexagonal scales, with a nedian row of broader scales along the under urface of the tail. Head much as in Sphenops, ut the muzzle more pointed ; the upper lip covering the mouth. Tongue broad, triangular, its left scarcely perceptible ; the incision of the palte small. Teeth very minute. Eyes minute, ith semi-transparent lower lid. No external race of ear. Nostrils terminal, placed in the nterior margin of the nasals, contiguous to ne front of each inter-nasal and the rostral ; ostral equilaterally triangular : supra-nasal road, heptangular, with apex to the front, onti-nasals sub triangular, a little elonated ; frontal obtusely subtriangular ; parieal inequilaterally pentangular, with obtuse poserior base, single and as large as the frontal. A rge subquadrilateral plate under the eye, and hree small transversely narrow plates in front of it, nd posterior to the nasal plate. A large diamond late on centre of chin, emarginated anteriorly to imit a small roundish plate which is bordered by ne anterior laterals. Tail shorter than the ody, and sub-cylindrical, flattened below.

(6963) *Sphenocephalus tridactylus*, Blyth, *n. s.* ery pale brown, a little deeper on the upper-parts. he largest of six specimens, measures 6 in. in tal length, of which the tail is 2 in, and distance art of the fore and hind limbs $\frac{1}{2}$ in. Length of re-limb $\frac{1}{8}$ in. ; of hind $\frac{9}{16}$ in. From Afhanistan. Presented by Dr. Allan Webb. he habit of this curious reptile is indicated by s structure. It is evidently a burrower, probay into loose sandy soil, where it would work its ay with its wedge-like muzzle, deriving considable *appuis* from its hind-limbs ; the minute foregs remaining generally close within the grooves into which they fit ; the head meanwhile being raised, and the long body arched,—an attitude which most of the specimens assumed when immersed in spirit.

The following is a remarkable limbless lizard from Rangoon, obtained by purchase.

(6964) *Ophiseps*, Blyth, *n. g.* Form anguine, of nearly uniform bulk throughout, tapering suddenly at the extremity of the tail ; no exterior trace of limbs ; and the vent placed in the middle of the entire length ; the body above, and tail above and below, covered with parallel ranges of quadrilateral keeled scales, the throat and belly with hexagonal smooth scales, and the tapering extremity of the tail with imbricated and rounded scales. A groove on each side from shoulder to vent. Tongue obtusely forked : no palatal teeth ; but a single row of small maxillary teeth, the triangular incision of the palate large. Eyes rather small, lacertine ; the lids scaly. Tympanum small. Nostrils small, lateral, head conical, somewhat compressed in front, the cleft of the mouth extending to beyond the eye. Rostral plate small, broad, triangular ; it and the nasals and anterior labials surmounted by numerous small plates and larger representatives respectively of a posterior nasal and united fronti-nasals. Frontal shield large, heptagonal with posterior base ; and the parietal inequilaterally pentangular, with anterior base. Fronti-parietals quadrangular. The streaks of the chin are sub quadrangular and placed obliquely. Along the median ridge of the back the parallel ranges of scales alternate, but not upon the tail.

(6965) *Ophiseps Tessellatus*, Blyth, *n. s.* Length of specimen $12\frac{1}{2}$ in., of which the tail measures $6\frac{1}{2}$ in. Colour pale dingy buff-yellow, paler below, with numerous plumbeous spots on the anterior half of the body above, composed of scales of that colour, some detached, others placed contiguously to form transverse bands more or less imperfect ; all the scales being highly lustrous. There are 14 parallel ranges of them above, from lateral groove to groove, and 8 such ranges below. From Rangoon.—*Blyth.*

REPTILIA OF TENASSERIM.—On these, Mr. Mason observes as follows :—

(6966) *Testudo radiata*, Small land tortoise. A small land tortoise is very common, and Dr. Gould, to whom I sent a specimen, said it was the above.—*Mason.*

(9967) *Testudo.* Large land tortoise. There is a large species, not uncommon in the interior.—*Mason.*

(6968) *Testudo geometrica.* Arracan land tortoise. A land tortoise in Arracan discovered by Capt. Phayre is the above.—*Mason.*

(6969) *Emys.* Marsh tortoise. A marsh tortoise, according to Dr. Cantor's classification, but according to Swainson and others, a river tortoise, is very common in Tenasserim streams above tide-waters, where it deposits its eggs in the sand; and is sometimes found within the influence of the tides.—*Mason.*

(6970) *Cistudo amboinensis*, Daudin. Box terrapin.

Syn. Testudo amboinensis, Daudin.
Emys „ Schweigger.
Tortue a' boite d' Amboine, Bosc.
Terrapene amboinensis, Merrem.
Kinosternon amboinense, Bell.
Terrapene couro Fitzinger.
Emis couro, Wagler.
Terrapene bicolor, Bell.

This is a small marsh, or river tortoise, very abundant in the small mountain streams.—*Mason.*

(6971) *Emys dhongoka.* Arracan marsh tortoise. This river or marsh tortoise, Capt. Phayre found in Arracan.—*Mason.*

(6972) *Gymnopus*? Soft tortoise. A river, or soft tortoise, is not uncommon, but I have not examined it.—*Mason.*

(6973) *Chelonia virgata*, Cuvier. Green turtle.

Syn. Chelonia midas, Gray.
„ fasciata.

The sea turtle common on the Tenasserim coast is identical in species with the turtle found on the coasts of America, and in the Red Sea. This turtle burrows, and deposits its eggs in the sands near the sea-shore.—*Mason.*

(6974) *Chelonia imbricata*, Linne. Tortoise-shell turtle.

Syn. La tortue caret, Dutertre.
Scaled tortoise, Grew.
Testudo marina americana, Seba.
Hawksbill turtle, Brown, Catesby.
Testudo caretta, Knorr.
La tuilee, Daubenton.
Caretta imbricata, Merrem, apud Gray.
Chelonia multiscutala, Kuhl?
Chelonee faux caret, Lesson.
Chelonia caretta, Temminck, and Schlegel.

Mergui is famous for its tortoise shell, but the specimens that have fallen beneath my observation have been, if I am not mistaken, the shell of the common green turtle. Still, it is probably found on Tenasserim coasts, for it is known to exist in the Malayan seas and the Indian ocean.—*Mason.*

(6975) *Crocodile.* Two species of crocodile inhabit Tenasserim rivers, and sea-shores, both of which are usually denominated alligators; but alligators are peculiar to America, and a glance at the scaly ridge on the back of the hind legs of the Tenasserim reptiles is sufficient to distinguish them from the alligators, which have the hind legs rounded.—*Mason.* Dean French, in his "Study of Words," *page* 125, says. "when the alligator, this ugly crocodile of the New World, was first seen by the Spanish discoverers, they called it, with a true insight into its species, 'el lagarto' or the lizard, as being the largest of that lizard species to which it belonged.

(6976) *Crocodilus vulgaris*, Cuvier. Common crocodile.

Syn Crocodilus palustris, Lesson.

The common crocodile of the Nile, the leviathan of the book of Job, is one of the species common in Tenasserim waters, and the other species is very slightly distinguished from it. Crocodiles are numerous in all its tide-water streams. During a two hours' pull up a small river, I once counted fourteen sunning themselves on the mud-banks. They often carry off the natives, and a single animal, emboldened by his successes, will usurp dominion over a particular portion of a river, where he becomes the terror of every boat's crew that passes. The steersman occupies the most dangerous position; for the crocodile's mode of attack is to glide up silently to the bow or stern of a boat, then turn suddenly, when with one stroke of his powerful tail, close to the top of the boat, he sweeps into the water whoever is within its reach, and the stunned victim becomes an easy prey. A Karen chief with whom I was acquainted, perished in this way two or three years ago, at a point in the river Gaing, which had previously been known as the desmesne of one of these river monarchs. Persons sleeping on their boats moored to the shore, have sometimes awaked in the jaws of these monsters; and one carried off a Burman a few years ago, from the back of a buffalo that he was riding across a small stream, under the very shadow of the walls of Tavoy.—*Mason.*

(6977) *Crocodilus porosus*, Schneider Seychelle crocodile.

Syn. Crocodilus biporcatus, Cuvier.

One species of crocodile that I examined had "the upper jaw surmounted by two rugged ridges, each commencing from the angle of the eye" This, then, is the species that tenants the Seychelle Islands.—*Mason.*

(6978) *Gecko.* The geckos, or house-lizards are very numerous in the Provinces, and embrace three or four different species.—*Mason.*

(6979) *Platydactylus gecko*, Linne. Flat-toed gecko.

Syn. Salamandra indica, Bontius.
Gecko ceilonicus, Seba.
Lacerta cauda tereti mediocri, Linnemus. Adolph.
Lacerta gecko, Linne.
Gecko teres, Laurenti.
Gecko verticillatus, Laurenti.
Salamandre ou gecko, Knorr.
Stellio gecko, Schneider.
Common gecko, Shaw.
Gecko guttatus, Daudin, apud Gray.
Lacerta guttata, Hermann.

Gecko verus, Merrem.
Gecko annulatus. Kuhl.
Gecko a gouttelettes, Cuvier.
Platydactylus guttatus, Cuv. apud Guerin.

The large gecko, which the Burmese call *touktay*, and the Malays *toke*, in imitation of the sound it makes, is very abundant. It disputes the possession of every cranny with the rats, and sometimes I think, devours their young. It has been seen making its repast on the small gecko. The natives think it noxious, and always avoid the reptile. According to Dr. Cantor, it is the Indian salamander of old writers; and new comers usually bottle up a few individuals to send to their friends as specimens of the rare, and unknown productions of the East, not aware that it was well described, and figured by the Catholic missionaries in Siam during the reign of Louis XIV.—*Mason.*

(6980) *Hemidactylus coctæi.* Common gecko. The small gecko, so abundant in Tenasserim houses, differs generically from Platydactylus Gecko, in having the "basal joint of four or five of the toes in each foot forming an oval disk." It is identical with the gecko seen in the houses in Calcutta. The spider of the English bible, Proverbs 30: 28, was undoubtedly a small gecko represented by this species, and the word was so rendered in the Syriac version made in the second century, and in the Vulgate Latin made in the fourth century. Jerome translated: "Stellio manibus nititur, Et moratur in ædibus regis," into.

"The gecko taketh hold with her hands,
And dwelleth in king's palaces."

Robinson says: "The opinion of the celebrated Bochart, that the newt, a species of small lizard, is meant, seems in every respect entitled to the preference [i. e. to that of spider]. This reptile answers to the description which the royal preacher gives of her form and habits, and is, according to the testimony of ancient and modern writers, found to take up its abode in the dwelling houses of the east." There is an approximation to the truth in these remarks, yet they contain several errors. Passing over the fact that newts are not proper lizards, though supposed so to be in the days of Bochart, no newts are known to take up their abodes in dwelling houses in the east. It is the gecko that takes hold with her flat fingers, and odious as are her looks, dwells even in the palaces of kings. The word rendered "ferret" in our version, is supposed to be a different name for this same animal, and on good grounds too, for in the Samaritan Pentateuch the Hebrew word is the same in both passages.—*Mason.*

(6981) *Hemidactylus frenatus*, Schlegel. Small thumbed gecko.

Syn. Hemidactylus lateralis, Gray.
,, quinquelineatus,

This species not usually distinguished from the preceding, with small thumbs without nails, is also common here as well as in Bengal.—*Mason.*

(6982) *Jungle gecko.* I have noticed a distinct species in the jungles, near Karen habitations, but never saw it in dwelling houses.—*Mason.*

(6983) *Ptychozoon homalocephalum*, Creveld, Wagler. Web-footed gecko.

Syn. Lacerta homalocephala. Creveld, Wagler.
Gecko homalocephalus Tilesius.
Pteropleura Horsfieldii Gray.
Platydactylus homalocephalus, Cuv.
Ptychozoon homalocephala, Kuhl.

Dr. Cantor describes a gecko from the island of Ramree, with the "toes webbed to the last compressed joint."—*Mason.*

MONITORS. The monitors or varans, commonly, but erroneously called guanas by Europeans, are represented by several species, both terrestrial and aquatic.—*Mason.*

(6984) *Hydrosaurus?* Swain. Monitor crocodile.

Syn. Monitor? Cuvier.

More than one hundred miles above tide-waters in the valley of the Tenasserim, the streams are inhabited by a large saurian, which the natives call a crocodile, of a different species from those that are found in tide-waters. The Burmese denominate it "the monitor-crocodile," and the Karens call it by the same name they do the crocodile, but it is probably a large species of varanus.—*Mason.*

(6985) *Hydrosaurus, ?* Swain. monitor.

Syn. Varanus.
Monitor, Cuvier.

A large water varan or monitor, inhabits the head-waters of the Tenasserim river. I have seen individuals five or six feet long dash into the stream from the river's bank, and lash the waters with their powerful tails in great glee, their active movements contrasting strongly with the sluggish motions of the crocodiles.—*Mason.*

(6986) *Varanus bengalensis.* Bengal Varan. One of the smallest aquatic varans, or monitors, of Tenasserim, about two feet long, I identified with a species found in the Museum of the Asiatic Society in Calcutta, which was, if I recollect right, the Bengal varan. It is the most abundant species in the Provinces, and may be often seen in the interior along the borders of streams, watching for its prey on the overhanging branches of trees. The Karens, who are extravagantly fond of their flesh, steal up the trees with a noose at the end of a bamboo, and often noose them while leaping for the water, or catch them on the boat which is brought under the tree. The head of this species, the natives say, is venomous, and they discard it altogether; but the flesh of the other parts, which smells most odiously, is deemed by the Karens much preferable to fowls. The Karens at Tavoy say there is a variety with a red head.—*Mason.*

(6987) *Varanus.* Terrestrial varan. A monitor or varan, of a yellowish colour, the Karens call the yellow varan. The specimens I have seen are a little larger than the preceding, and it differs from it in being a terrestrial, and not an aquatic species.—*Mason.*

(6688) *Varanus.* Black varan. According to the description of the natives, there is a distinct species of varan in the interior, which the Burmese call the black varan, but I have never seen it.—*Mason.*

(6989) *Varanus.* Maulmain varan. There is a terrestiral varan at Maulmain, which the natives describe as distinct from the preceding.—*Mason.*

(6990) *Varanus bicinctatus.* Large Arracan varan. A large varan is found in Arracan, which may or may not be one of these species.—*Mason.*

IGUANA TRIBE.

Of the family of the guanas, the principal members in the Tenasserim Provinces are called by Europeans, chamelions.—*Mason.*

(6991) *Calotes versicolor.* Blood-Suckers. This is the tree-lizard with a gular pouch, that possesses the power in a slight degree of changing its colours, and has been regarded as a chamelion. These lizards appear in very different costumes at different seasons, which has probably assisted them not a little to the name. Many of them are seen at the beginning of the rains, of a beautful azure of various degrees of intensity, according to the excitement of the reptile; but at the commencement of the dry season they are of an uniform ash colour. The karens say there are two species. This was the one I sent Mr. Blyth.—*Mason.*

(6992) *Calotes mystaceus.* Large Blood-Sucker. Mr. Blyth suggested that we probably had a large species, but I have never identified it.—*Mason.*

(6993) *Dilophyrus grandis.* Dilophyer. This is a reptile figured, and described by Dr. Cantor, said to be found at Rangoon. It resembles the blood-sucker, but has a large crest on the head and back, and differs in the colouring.—*Mason.*

(6994) *Dracunculus maculatus.* Flying lizard.

Syn. Draco Maculatus.

A species of flying lizard inhabits the Provinces, but it is rarely seen.—*Mason.*

(6995) *Draco lineatus..* Arracan flying lizard.

Syn. Dracunculus Lineatus.
Leiolepis guttatus.
„ Revesii. Gray.
Uromastix Revesii. „

The flying lizard of Arracan is a nearly related. but distinct species. It has been referred to two different genera, and there may possibly be two distinct species.—*Mason.*

(6996) *Lacerta, Linn. Sand lizard.* On sandy plains, and other arid situations a sand-lizard may be often seen, which, on being approached takes refuge in its burrow in the earth. Their cavities are not deep, and the Karens, who regard them as a delicacy, frequently dislodge them. It is a beautiful reptile, the body about six inches along, and the tail twice that length, remarkable for its powers of flight. It is of a grey colour, with shades of blue and green. It has a longitudinal band on each side from the head to the tail, of a greenish colour, sometimes inclining to blue. A row of black spots with a greenish centre down the upper parts and a few similar ones each side the marks of the back, between that and the lines on the sides. The tail has four rows of similar points, and the sides of the body and legs are marked in a like manner, but the dots are larger. There are two long sharp teeth at the front of each jaw. It has five claws on each foot, and one on each hind foot is double the length of the others. There is no collar of broad scales round the neck. No shields in the head.—*Mason.*

(6997) *Euprepus rufescens.* Shaw. *Scink.*

Syn. Lacerta maritima maxima, Seba.
Lacerta rufescens, Shaw.
Scincus rufescens, Merrem.
Scincus multifasciatus, Kuhl.
Mabouya multifasciata, Fitzinger.
Euprepis multifasciatus, Wagler.
Tiliqua rufescens, Gray.
Eumecus rufescens Wiegmann.
Tiliqua carinata, Gray.
Tiliqua affinis Gray.
Euprepis sebæ, Dumeril et Bibron.

This smooth, snake-like reptile is sometimes called the grass-lizard, as it may be seen darting about in the grass. It frequently enters outhouses, but is rarely seen in the interior of dwellings. There is considerable variety of colouring in different individuals, from which the Karens distinguish three species, but they are probably all varieties of a single species, which is found from the Sandwich Islands to Hindustan.—*Mason.*

POISONOUS SERPENTS.

Venomous serpents are quite numerous, both terrestrial and aquatic; yet during a twenty years residence, not a single fatal case from the bite of a terrestrial serpent has come to my knowledge.—*Mason.*

(6998) *Elaps melanurus,* Elaps.

Syn. Coluber melanurus, Shaw.
Vipera trimaculata, Daudin.
Elaps trimaculatus, Merrem.

This is a small poisonous serpent described by Dr. Cantor as inhabiting the Provinces, but which I have not satisfactorily identified. It has a very small mouth, and rarely bites, but its venom is said to be "as virulent as that of other venomous serpents."—*Mason.*

(6999) *Fire serpent.* The Elaps is perhaps the "fire serpent" of the Karens so called from the burning produced by its bite, which they say is poisonous, but not fatal. It is the smallest poisonous serpent in the Provinces. According to the Burmese it has a more wonderful power of reproducing itself than the hydra of antiquity. They say if one be killed, two or three others immediately arise in its place, and a Burman, who, I believe, intended to speak the truth, assured me that he once killed one, and immediately he saw two others, close by the dead one, without being able to conjecture whence they came. Its Burman name signifies the "father of many." I have repeatedly had small innocuous serpents brought me for this fire-snake; but when I showed the natives that there were no poisonous fangs, and that no others appeared at the funeral of my specimens, they coolly replied that they were mistaken; they had not brought me the true reptile. Some of the Karens think it a species of trigonocephalus.—*Mason.*

(7000) *Bungarus fasciatus*, Schneider. Yellow-banded bungarus.

SYN. Boa fasciatus. Shaw.
Pseudoboa fasciatus, Schneider.
Bungarus annularis, Daudin, Schlegel.
Aspidoclonian.

The bright belted bungarus, a poisonous serpent, with alternate black and yellow bands, is a splendid reptile, often seen in the vicinity of Maulmain. It grows six or eight feet long, and five or six inches in circumference. Its bite is usually deemed fatal, but I knew a Karen woman to be bitten by one in the foot, and she ecovered, though after much suffering. The ail terminates in a hard bony point, which the Karens think is a sting.—*Mason.*

(7001) *Bungarus candidus*, Linne. White-banded bungarus.

SYN. Bungarus cœruleus, Daudin.
„ semifasciatus, Kuhl, Schlegel.
Aspidoclanion semifasciatum, Wagler.
Boa lineata, Shaw.
Pseudo-boa cœrulea, Schneider.
Coluber candidus, Linne.

A specimen of another species with white ifurcated bands was killed in Maulmain after making a gallant defence. All the species of his genus are furious snakes when their anger s aroused, and at certain seasons the natives ay pursue their antagonists a long distance; lthough Dr. Cantor confines this characteristic to the hamadryad.—*Mason.*

(7002) *Hamadryas* ? Dusky Hamadryad. The atives describe a venomous serpent that grows en or twelve feet long, with a short, blunt head, dilatable neck, thick trunk, and short tail. It s of a darker colour than the common cobra, nearly black. I have never seen it, but the description given me accords so well with the generic character of hamadryas, that it must be a species of that genus. "The hamadryas," says Dr. Cantor, "is very fierce, and is always ready not only to attack, but to pursue, when opposed;" this, too, is a conspicuous trait in our Tenasserim serpent. An intelligent Burman told me that a friend of his one day stumbled upon a nest of these serpents, and immediately retreated, but the old female gave chase. The man fled with all speed over hill and dale, dingle and glade, and terror seemed to add wings to his flight, till reaching a small river he plunged in, hoping he had then escaped his fiery enemy, but lo! on reaching the opposite bank, up reared the furious hamadryad, its dilated eyes glistening with rage, ready to bury its fangs in his trembling body. In utter despair he bethought himself of his turban, and in a moment dashed it upon the serpent, which darted upon it like lightning and for some moments wreaked its vengeance in furious bites; after which it returned quietly to its former haunts.—*Mason.*

(7003) *Hamadryas ophiophagus*, Cantor. Belted hamadryad.

SYN. Naja elaps Schlegel.
„ bungarus, „
„ vittata, Elliot.

Karens from Pegue describe a species of hamadryad with black and whitish transverse bands. It is often seen twelve feet long, by a foot in circumference, and one of my informants tells me he has seen them nearly three fathoms long, and proportionately large. It does not appear to be known in these Provinces, but the Burmese and Karens have well established names for the species; and it must be, I think, the above, of Cantor's.—*Mason.*

(7004) *Naja lutescens*, Laurenti. Tenasserim cobra.

SYN. Coluber naja, Linne.

The Tenasserim cobra differs from the described species in the marking of the hood. In the common Indian species (*N. tripudans*) the hood is figured with "a double reversed horse-shoe line of black or brown, with the two ends dilated so as to inclose an oval space, in the centre of which is a ring or spot of black." In the Tenasserim species there is only a single oval white ring, edged with black, in the centre of which is a ring or spot of olive-green, the general colour of the snake, but black on the margin. In other respects it does not differ from *N. tripudans*. Cantor has described a species which he calls *N. larvata*—"Brownish, with numerous faint transverse stripes; the hood marked with a white ring, not unlike the form of a mask, behind which there are from three to five white rings;—the anterior part of the lower surface with alternate white and bluish-black rings." This cannot be our species, for it has none of the additional white rings behind the hood, nor on the lower surface any "transverse stripes." As these are the only Indian cobras described, is not ours a new species? The incantation of serpents has usually been attributed to the power of music, and a late writer remarks that "it is so strange that many have denied the fact, while others have asserted it to be a deception." "Our own conviction," he adds, "is, that serpents are extremely sensitive of impressions from musical notes, or modulations, under the influence of which they wreathe their bodies from feelings of pleasure, while to these graceful contortions and undulating movements, the charmer, who plays on a pipe or some simple instrument, adapts the time." This is the common theory,—that serpents are rendered docile by music. It must however, be abandoned; for with many others I have seen the cobra dance in imitation of its Burmese master, while he sat upon this haunches before it, making the motions with his body and hands that he wished the snake to imitate, and which it did perfectly without any music whatever; or any other sound except an occasional authoritative *hay!* Again, a pair of cobras kept perfect time with their master, while no sounds were uttered and allowed him to handle them as he wished. At his command they danced, and at his command they lay gracefully down as if asleep The Burmese usually put a wild one, which they secure when half or two thirds grown, with a practised tame one. These will dance and wreathe themselves at their master's pleasure. Sometimes darting at him but at that moment he straightens himself up, with his eyes fastened upon the snake's eyes, and in a gruff voice commands them to perform. Following his motions, they stand almost upright with their hoods dilated and their colours all in play as they dance; now swift—now slow—now approaching—now receding;—and I have seen the younger in his receding moments give unequivocal tokens of desiring to make his exit: but on hearing his master's call he turned again though evidently with more reluctance than the old actress. The power of effecting all this is certainly attributable neither to magic nor music. It must, I think, be ascribed to fear, and to a very simple principle—the power of imitation; a power possessed by different animals in different degrees. Serpents are by no means the least docile of the animal kingdom; nor are cobras the most intractable of serpents. Although quite abundant in the Provinces no case of a person's being bitten by one has ever come to my notice, but I have frequently known of individuals having been bitten by the green viper, a serpent which is much readier to bite than the cobra; and one which, it is worthy of remark the serpent charmers do not make use of; the cobra, and the bungarus, being their favourites. The largest cobra I have seen on the Coast measured five feet nine inches. It killed a good dog that attacked it, and was dispatched in the nocturnal melee by Mr. Ranney, who supposed he had killed a common rat-snake, until he found his dog was mortally wounded.—*Mason.*

(7005) *Viper.* The natives describe a serpent whose poison they say is much more deadly than that of the cobra. It is very short and thick, without a hood, say some, but others state that it can dilate its neck, though not to the extent that the cobra can. The description accords best with a species of viper, but I have never seen it. It is thought to be rare in these Provinces, though abundant in Burmah; and not uncommon in the neighbourhood of Martaban.—*Mason.*

(7006) *Trigonocephalus gramineus,* Shaw. Green viper.

Syn. Trigonocephalus viridis Schlegel.
,, erothrurus. Cantor, (young.)
Coluber gramineus, Shaw.
Vipera viridis, Daudin.
Trimeresurus viridis, Lacepede.
Cophias viridis, Merrem.
Bothrops, Wagler.

This poisonous serpent may be readily distinguished from all the innocuous ones of a similar colour by the head being covered with scales and not with plates. The Karens describe two species, one with a red tail, and the other with a red line down each side, but Dr. Cantor regards them as varieties of the same species. They may be often seen in trees, and their colouring so much resembles the foliage that I have had my hand drawn back by a native when about to lay it on one that I was looking for among the branches, but with no intention of touching the reptile. They appear to bite more frequently than any other venomous terrestrial serpents in the Provinces, but although the limb that is bitten always swells up to a monstrous size and much pain ensues, yet I never heard of a case proving fatal. The natives have a saying to the effect that the part of the limb below the bite is destroyed, but this I very well know to be an error. After recovery, the limb, in the cases that have come to my knowledge remained uninjured.—*Mason.*

(7007) *Hydrus,* vel *Hydrophis.* A species of poisonous water snake abounds in our estuaries and rivers, as far as tide-water ascends. Their bite has proved fatal in every case that has come under my observation, and that too in a very short period after the wound was inflicted. The Burmese, however, tell me that persons do sometimes recover, and that bites in the rains usually prove more fatal than in the dry season. They are exceedingly numerous. At the fishing stakes, near the mouths of rivers, where I have watched the fishermen at their labours, scarcely a draught of fish was drawn up without one or two of these serpents being among them. There are several species, but I have never examined their specific distinctions; and the Burmese call all One species, with a cylindrical body, the natives say never bites without producing death.—*Mason.*

(7008) *Laticauda scutata.* Flat hydrus. Another pelagic serpent, the Burmese say, has a flat body, and its bite, though poisonous, may be cured by medicine. It is probably this—*Mason.*

(7009) *Hydrus gracilis,* Shaw. Slender sea snake. In the delta of the Irrawady the Karens inform me, a water snake departs and returns with the tide, that is about two yards long, but not thicker than the thumb; and the anterior part of the body is much smaller than the posterior. It is said to coil itself around every object with which it comes in contact. It is probably this—*Mason.*

INNOCUOUS SERPENTS. Innocuous serpents are very numerous, from the diminutive blind worm that hides itself in its burrow, to the gigantic python that displays its coat of many colours in the tree tops, ready to dart upon any animal that seeks the shade.—*Mason.*

(7010) *Typhlops braminus,* Daudin. Blind worm.

Syn. L'Orvet lombric, Laccpede.
Anguis, Russell.
Punctulated slow-worm, Shaw.
Eryx braminus, Daudin.
Typhlops rondoo talooloo, Cuvier.
Tortrix russelii, Merrem.
Typhlops. .. Schlegel.
Argyrophis braminus, Gray.

The blind worm, or slow worm, belonging to the class of burrowing serpents, is not uncommon but I have seen it dug out its hole in the earth as often as I have met with it on the surface. The popular idea of its being exceedingly poisonous, so common in England, is still more prevalent here, and the natives are much afraid of it. When they are shown its mouth, and its inability to do injury demonstrated, they turn to the pointed excrescence on the tail, and express their confident belief that it has a sting there like the scorpion. Dr Cantor, who appears to have had a specimen from these Provinces, identifies it with *Typhlops braminus,* and gives the synonyms which will be found above; but our reptile differs from any description or figure that I have seen. The upper jaw projects, in a specimen before me, the tenth of an inch beyond the lower, so that the mouth opens quite below the head. The eyes are beneath the skin, through which they are seen, and the scales have each a dark spot on them, so that the general appearance is that of lead coloured spots on a dull-white ground. Lacepede's figure of *Le Lombric* represents it the nearest of any figure I have seen, but there is a horny excrescence at the extremity of the tail, with a conspicuous sharp thorn, not seen in the figure. Dr. Cantor says that of a great number which he examined, the largest was not eight inches long; but a specimen before me measures more than twelve inches in length, and the body an inch and a quarter in circumference. —*Mason.*

(7011) *Python reticulatus.* Schneider. Python.

Syn. La jaune et bleue, Lacepede.
L'onlarsawa, Bonnaterre.
Boa reticulata, Schneider, apud Daudin.
,, rhombeata, ,, (?)
,, constrictor. Var. e Latreille.
, phrygia, Shaw.
Python amethystinus, Daudin.
,, des isles de la Sonde. Merrem.
,, schneiderii, Merrem.
Coluber javanensis, Fleming.
Python javanicus, Kuhl.

A large python, usually called a boa, is not uncommon. I have seen the head of one that was killed by a drove of hogs whose whole length measured eighteen feet, and the natives say they grow much larger. The Karens have an apothegm that the largest python can swallow a full grown buck-rusa or sambur deer, horns and all without inconvenience. They are often seen coiled up among the branches of trees, on the banks of streams in the interior, where they are frequently noosed by Karens, who regard them as valuable food. I have seen a Karen seize one nine feet long by the tail in the water, and with the aid of his associates succeed in capturing him. According to a Karen legend, all the poisonous serpents derive their virulence from the python, which, though innocuous now, was originally the only one that was venomous. In those days he was perfectly white, but having seduced away a man's wife, aunt Ee, [Eve ?] he made her, while she was in his den, weave figures on his skin in the forms which are now seen. At that time, if he bit the footstep of a man in the road, such was the virulence of his poison that the man died, how far soever that man might have passed from the bitten track. The python had not, however, any ocular demonstration of the fact, so he said to the crow: "Crow, go and see whether people die or not when I bite the foot-track." The crow went to the neighbourhood of a Karen cabin, and found the people, as is their custom at funerals, laughing, singing, dancing, jumping, and beating drums. He therefore returned to the python and told him, that so far from his efforts producing death, on the contrary they produced joy. The python was so angry when he heard this, that he ascended a tree, and spit up all his venom; but other creeping things came and swallowed it, and people die of their malignancy to this day. The python made them promise, however, not to bite without provocation. The cobra said: "If there be transgression so as to dazzle my eyes, to make my tears fall seven times in one day, I will bite." So said the tiger. The Karens suppose the bite of a tiger to be as virulent as a serpent's bite and others, and they were allowed to retain their poison. But the water-snake and frog said they would bite with or without cause, as they liked, so the python drove them into the water, where their poison melted away, and their bite became harmless. The tree, however, from which the python spit up his venom became deadly, and its juice is used to this day for the purpose of poisoning arrows. The gall bladder of the python is much sought after by natives for its medicinal virtues, which are in great repute, especially among Karens. The natives say there are two or three species, but all that I have examined belong to one.—*Mason.*

(7012) *Acrochordus javanicus.* Innocuous estuary-serpent. The Burmese describe a harmless snake,strongly resembling the venomous hydrus, and like that inhabiting the estuaries and tide-water streams. I have never seen it, but a Burman who had been bitten by one, said its bite was like the bite of a dog. He described it as about six feet long when full grown, and with a variegated skin. It must be a species of acrochordus, and probably this—*Mason.*

(7013) *Lycodon aulicus,* Linne. Lycodon.

Syn. Lycodon capucinus, Boie.
,, hebe, Schlegel.
,, atropurpureus. Cantor.
Coluber striatus, Shaw ?

A small harmless snake is common at Maulmain, with the head depressed, not very distinct, and lighter or darker chesnut, with numerous white transversal bands on the side forming a network composed of brown scales edged with white." It is of the genus lycodon, but the natives, to whom I have shown specimen, are not united in the name appropriated to it, either in Burman, or Karen.—*Mason.*

(7014) *Coluber radiatus,* Schlegel. Striped rat snake.

Syn. Coluber quadrificatus. Cantor.

A species of coluber, green-yellow on the back, with a broad black longitudinal band, interrupted at intervals, and a narrower one on each side, is often found where rats resort, on which it preys, and hence it is called a rat snake. One that dropt from the roof of my house into the dining-room on being attacked by a cat, defended itself furiously, and came off victorious. I have seen them in the act of swallowing rats twice the circumference of their own bodies.—*Mason.*

(7015) *Coluber korros,* Shaw. Brown-green rat snake. Another snake, with the habits of the preceding, but destitute of its stripes, and brown-green on the back, is common throughout the Provinces. Under certain circumstances the Burmans say the bite of this serpent is fatal. These are five: *gnang-soung, loo-soung, young-soung, lan-soung, ne-soung.* "Snake oblique, man oblique, turban oblique, road oblique, and sun oblique." That is, if the snake approaches a man with its head askance, as this snake is always said to do, and the man look at it askance, and if his turban be put askance, and he be moving on the road askance, and the sun be askance descending in the heavens; when these five circumstances meet, if the snake bite, which by the way is always very improbable, death will certainly ensue!—*Mason.*

(7016) *Coluber nasutus,* Shaw. Ribbon snake.

Syn. Dryinus nasutus, Bell.
,, prasinus, Reinwardt.
Dryophis ,, ,,
Tragops, ,, Wagler.
Passerita, ,, Gray.
Dryiphis prasina, Schlegel.

This tree snake, is grass-green all over from the head to the tail, excepting the under lips and throat which are whitish, and a white line on each side which divides the upper from the under parts, or the scales from the scuta and scutella. The skin under the scales is black, alternating with light blue, and these colours play between the scales when the snake is struck. The head is long and attenuated, and the upper jaw, which is longer than the lower, is slighly recurved with a small snout of a curved plate. There are fifteen rows of imbricated rhomboidal scales on the body, the rhomboidal form of the scales appearing most distinct on the tail. It is probably *Dryinus nasutus,* of which I have no description, and although it differs in some respects fromCantor's description of *D. prasinus,* I presume it is a variety of the same species. The whole length of a specimen before me is four feet four inches, of which the tail is one foot six inches.—*Mason.*

(7017) *Dipsas cynodon.*Variegated tree snake. A tree snake, with a cordate head much wider than the neck and body, is not uncommon. It is covered with brownish black spots, but may be best recognized by "a dark, black-edged, arrow-shaped mark" on the head, and a black oblique streak from the eyes to the nape of the neck."—*Mason.*

(7018) *Dipsas multimaculatus.* Dr. Cantor describes a second, and nearly related species from the Provinces.—*Mason.*

(7019) *Tropidonotus stolatus,* Linne Buff-Striped Tropidonotus.

Syn. Coluber stolatus, Linne.
Le chaygne, Daubenton, Lacepede.
*La vipere chapgne, Latreille.
Coluber tæniolatus, Daudin.
Natrix stolatus, Merrem. .

This is a small aquatic snake, with black bars across the body, interrupted by a buff-coloured, longitudinal band on each side, common in the paddy fields around Maulmain.—*Mason.*

(7020) *Tropidonotus schistosus*Black-Striped Tropidonotus.

SYN. Tropidonotus mœstus, Cantor.
Coluber schistosus, Daudin.
„ surgens, Cantor.

This is a darker colored species than the preceding, and has an obscure black line down each side. When attacked it distends its neck like a cobra, but to a less extent, and they are sometimes mistaken for cobras. Half a dozen natives who had seen an individual display this power, would not be convinced, but the reptile was a cobra, although they saw the snake's mouth was destitute of fangs.—*Mason.*

(7021) *Homalopsis rhinchops*, Schneider. Water snake.

SYN. Hydrus rhinchops, Schneider.
Boa moluroides, „
Elaps boæformis, „
Enhydrus rhynchops, Latreille.
Hydrus cinereus, Shaw.
Hurria schneideriana, Daudin.
Coluber schneiderianus, Daudin.
„ cerberus, Daudin.
Python rhynchops, Merrem.
„ elapiformis, „
„ molurus. „
Coluber obtusatus, Reinwardt.
Cerberus (Homalopsis obtusatus) Cuvier.
Homalopsis schneiderii, Schlegel.
Cerberus cinereus, Cantor.

Innocuous water snakes of the genus homalopsis, are very abundant: viz.

Erpeton, Lacepede.
Rhinopirus, Merrem.
Pseuderyx, Fitzinger.
Cerberus, Cuvier.
Hypsirhina, Wagler.
Hydrops, „
Helicops, „
Potamophis, Cantor.

I have noticed three distinct species at Maulmain, all of which are called by the Burmese *yayhmwey*, or water snakes, while the poisonous aquatic serpents are called *gyat*. It becomes an inexperienced observer however, not to trust implicitly to the natives, for they often handle the venomous ones as carelessly as if they were harmless; and at other times they will stone an innocuous one as if its bite were fatal. One species is of a dark grey, or olive-green colour on the back, and white on the belly, with transversed black bands.—*Mason.*

(7022) *Homalopsis enhydris*, Schneider. Iridescent Water-Snake.

SYN. Hydrus enhydris, Schneider.
Enhydris cœrulea, Latreille.
Hydrus atrocœruleus, Shaw.
Coluber pythonissa, Daudin.
Hypsirhina, Wagler.
Potamophis lushingtonii, Cantor.
Homalopsis aer, Schlegel.
„ olivaceus, Cantor.

An allied species is not rare, which is "iridescent dark greenish, or brownish olive above, the scales edged with black; in some two parallel light grayish lines from between the eyes to the tip of the tail." It has the same native names as the preceding species.—*Mason.*

(7023) *Naked serpents.* According to Cuvier the cæcelia tribe of reptiles are naked serpents.—*Mason.*

(7024) *Cœcelia* ? Cæcelia. The cæcelia can be easily distinguished from an earth-worm when it opens its serpent-like mouth, but in ordinary circumstances it will be considered an earth-worm. A species with a longitudinal band on each side is quite common.—*Mason.*

FROG TRIBE.

The Karens have distinctive names for fourteen different species of frogs and toads, but I have paid them very little attention.—*Mason.*

(7025) *Rana tigrina*, Daudin. Tiger Frog.

SYN. Rana mugiens, Latreille.
La grenouille taureau, Cuvier.
Rana limnocharis, Boie, MS.
„ cancrivora, Gravenhorst.
„ picta „
„ brama, Lesson.
„ rugulosa, Wiegmann.
„ vittegera, „

One of the largest species of frogs in the Provinces is—*Mason.*

(7026) *Polypedatus.* Tree frog. Of a tree frog that I sent Mr. Blyth he wrote: "The tree frog is a species of polypedatus, which I have previously received from Arracan and Assam."—*Mason.*

(7027) *Hyla bengalensis*, Gray. Bengal tree frog.

SYN. Polypedatus;

Another species that I sent him he said was this.—*Mason.*

(7028) *Bufo melanostictus.* Schneider. Toad.

SYN. Bufo bengalensis, Daudin.
„ scaber, Latreille.
„ dubia, Shaw.
„ carinatus, Gray.

A large toad which I have seen the Burmese doctors bringing into town, bound hand and foot, "for medicine," is not uncommon.—*Mason.*

(7029) RESEDA ODORATA is the common Mignonette. It has lanceolate bluntish entire or trifid leaves; a 6-parted calyx equal in length to the petals, which are finely cleft into many club-shaped divisions, the two lowest simple, the capsules 3-toothed. It is a native of the North of Africa and Egypt, but its delicious fragrance has caused it to be cultivated all over the world. It is naturally an herb, but when trained in the greenhouse it becomes shrubby. The arborescent form of this plant is called Tree-Mignonette.—*Eng. Cyc.* There are many species of the genus, Reseda, most of which are natives of the South of Europe and Egypt. In India, this sweet-scented little plant may be cultivated throughout the year, only requiring moderate care in watering ; and when the blossoms have passed their maturity, cut down the shoots, when fresh ones will spring up. If you require the seed, observe, as soon as the capsules are full, to pick off the branches and let them dry ; otherwise if let remain on the plant, they drop out and are lost. It loses much of its fragrance, if grown in too rich a soil. Is propagated by seed, either in pots or beds ; each plant should be about from four to five inches apart.—*Riddell.*

(7030) RESEDACEÆ, a natural order of Plants belonging to the class of Exogens. This order embraces the genera *Reseda, Ochradenus, Oligomeris, Holopetalum, Astrocarpus* and *Caylusea.*—*Eng. Cyc.*

7031) RESINS. Resinous substances are found in greater or less abundance in most plants. Many of them exude naturally from fissures in the bark or in the wood, or they are obtained from incisions made in certain trees and shrubs. As they exude they are commonly mixed with an essential oil, which either evaporates on coming in contact with the air, or is resinified by the action of oxygen. Such mixtures of volatile or essential oil with resins are sometimes called *balsams* [See BALSAM]. When gum is mixed with resins another class of substances is produced, called *gum-resins.* [See GUM-RESINS]. The resins when pure and free from essential oil have no odour except when rubbed or heated. Their colours are pale yellow or brown ; they are good insulators, and become electric by friction. Most of them are heavier than water and insoluble in that fluid ; they have little or no taste, but those which have distinctive flavours derive them from minute portions of some non-resinous body. They are usually softened or even fused by being boiled in water, and some of them in such a case pass into hydrates. They are inflammable, burning in the air with a sooty flame, and yielding by dry distillation volatile liquids and inflammable gases. The natural resins are usually composed of two or more resinous substances which may be separated by the action of alcohol, in which most resins are soluble. They are also mostly soluble in ether in sulphuret of carbon and in the fat and volatile oils. Alcoholic solutions of many of the resins act the part of feeble acids, reddening litmus paper, and combining with and neutralizing acids. These compounds are termed *resinates* or *resin-soaps*, and are distinguished from *oil-soaps* by not forming a gelatinous emulsion when concentrated, and by not being separable from water by the addition of common salt : they are, however, detergent and form a lather like common soap. [See SOAP.] Other resins are indifferent either as an acid or a base, but there are a few which are regarded as *basic.* The resins are thrown down from their alcoholic solutions by the addition of water, the white pulverulent or curdy precipitate forming the *magistery* of the old chemists. The alcoholic solution of the acid resins is not precipitated by ammonia ; but the precipitate thrown down by the addition of water is soluble in solution of ammonia. The alcoholic solution of the indifferent resins is precipitated by ammonia. The acid resins may also be distinguished by the crystalline precipitate produced by the addition of their ammonio-chloride solutions to nitrate of silver. Some of the resins dissolve in sulphuric acid without decomposition in the cold, and they are precipitated by the addition of water ; but if heat be applied sulphurous and carbonic acids are disengaged, and a carbonaceous mass is obtained mingled with another substance which has been improperly named *artificial tannine.* The action of nitric acid upon resins leads to the formation of various new products. Acetic acid dissolves many of the resins, as does also muriatic when concentrated. The resins have been considered as oxides of definite hydrocarbons : but their analysis is very imperfect and will be further noticed under TURPENTINE.—*Tomlinson.* For the Madras Exhibition of 1855, a fragrant Resin from the Bababooden Hills, Mysore, was forwarded by Mr. R. D. Meppen, the leaves sent appear to belong to one of the Dipterocarpeæ. A green semi-transparent hard resin from Coorg, was soluble in spirit, and promised to make excellent coach varnish, the tree is not known.—*M.E.J.R.* Resins are solid, brittle, of a certain degree of transparency, and a colour commonly inclining to yellow. When pure, they are soluble in alcohol and in oils, but not in water, in which respect they differ from gums. They are more or less acted upon by the alkalies.

The generally known Indian resins and balsams, are

Copal (soondroos,)……	*Vateria indica.*
Anime,…………………	
Dammer (rhal and dhoona,)… … …	*Shorea Robusta.*
Mastic (mustakee,)……	*Pistacia lentiscus.*
Peynie (pandum,)… …	*Vateria indira.*
Theetsee,………………	*Melanorrhœa usitatissima.*
Wood oil, (gurjun,) …	*Dipterocarpus turbinatus, &c.*
Benzoin (loban,)………	*Styrax benzoin.*
Do. a kind of,… . .	
Liquid balsam of storax (rosa mallos,)	*Liguidambar altingia.*

(7032) *Resins Gum-resins, Gutta perchas and Gum-Elastics, of Eastern and Southern Asia.* Under this head are included the following :

1. Piney or Vateria.
2. Canarium : and.
3. Vatica or Shorea, all known as dammer.
4. Kino.
5. Lac.
6. Dikkamaly.

7. Benjamin.
8. Myrrh.
9. Poon-yet.
10. Mutti-pal.
11. Aloes.
12. Gamboge, &c.
&c. &c.

The most important of all the solid resins produced in India are those which are included under the general name of "Dammer," and it will be the chief object of this report to clear up the doubts which have hitherto existed, as to what particular trees yield each of the crude products found in the bazars. It will therefore be advisable to quote the various authorities on the subject, before proceeding to show the result of the Jury's investigations.

Ainslie, speaking of "dammer or Indian resin" which he refers to the *Chloroxylon dupada* of Buchanan (the *Vateria indica* of Linnæus,) says :—"Of the substance usually termed dammer and improperly country rosin, there are three sorts to be met with in the bazars, called in Tamil "*vullay coonghilium.*" "*curpoo coonghilium*" and "*noray coonghilium,*" or white, black, and coarse dammer. It much resembles the resin obtained by distillation from the turpentine of the *Pinus sylvestris*, both in appearance and natural qualities, and would seem to be a common product of many asiatic countries. I perceive it is to be procured in great abundance in Sumatra from a tree called by the Malays "Canari." (*Dammara nigra legitima* of Rumphius.) The "Canari," we may observe is the *Canarium* of Roxburgh and yields the black dammer of the Western coast of India. In Java, Borneo, Joanna and several of the Sooloo islands, dammer is quite common, and a regular export to the continent of India. The coarse or stony kind, the Malays call "dammer batu" and the Javanese "dammer selo," the white or fine sort they term "dammer puteh." * * * * * * Dr. Buchanan Hamilton in his interesting "Journey through Mysore" informs us that he found the tree which yields dammer growing in the woods of Malabar, and in the mountainous tracts which separate the Travancore country from the Madura district, and bestowed on it the scientific name of *Chloroxylon dupada*, though Ainslie then knew well that the greater part of the dammer met with in India, is an import from more Eastern countries. How far, he adds, the "*Chlorozylon dupada*" differs from the *Dammara nigra legitima* of Rumphius, I regret to say I am not now prepared to state," * * * * * * * The tree to which Dr. Buchanan gave this name of Chloroxylon dupada had been already described by Linnæus under the name of *Vateria Indica*, which it still retains. The specific name *dupada* was derived by Dr. Buchanan from the Canarese name "dupa," applied to this, and probably to other species of the Vateria growing in Mysore and the Western Coast. It may also be noted that the *Canarium strictum*, called by way of distinction the "black dammer tree" also grows in precisely the same locality and bears such a general resemblance in the color and shape of its leaves and growth to the Vateria, that it can only be distinguished on a somewhat close inspection. From this circumstance, no doubt, arose the belief that both the white and black dammers were produced from the same tree, and as the few which Dr. Buchanan saw were probably *Vaterias*, he naturally concluded that this tree alone yielded both species of dammer.

In short, omitting what refers to foreign products with which we have no immediate concern, the whole of Ainslie's remarks may be briefly summed up as follows—Ainslie's "Curpoo Coonghilium" is doubtless the product of the *Canarium* of Sumatra and the Western coast of India, whilst his other two sorts may be either the products of the *Vateria* or *Shorea*, probably both. The three varieties are *not* the produce of the *same* tree, as Ainslie seems to have supposed. His *vuelay* and *noray coonghilium* or white and coarse dammer, supposing them to be the products of the western coast and derived from this Chloroxylon dupda—the white dammers of the northern Circars which will be considered hereafter are derived from the Shoreas—are the products of the Vateria Indica of Linnæus (the *Chloroxylon dupada* of Buchanan), which is the *Dupa maram* of the Canarese, the *Chadacula* of the Tamools, and the *Payanee* or *Piney* of Malabar. His *curpoo coonghilium* or black dammer is the product of the *Canarium* of Roxb. and Wight, the *dammara nigra legitima* of Rumphius, and the *Canari* of the Malays. Roxburgh's description of the principal resiniferous trees of India is here given as extracted from O'Shaughnessy's Bengal Dispensatory.

(7033) *Vateria Indica—Linn.*

Chloroxylon Dupada, HAM.
Piney marum TAM.
Dupa marum, CAN.
Chadacula, TAM.
Tayanee, MALABAR.

This is a very large and stately tree, a native of Malabar, and lately found also in Mysore. The young shoots and all tender parts except the leaves are covered with fine stellate pubescence, leaves alternate, petioled, oblong, entire, from emarginate to obtuse, pointed, smooth, coriaceous, from four to eight inches long and two to four broad, petioles round about an inch long; stipules oblong, panicles terminal, ramifications rather remote; flowers rather remote, pedicelled, pretty large; bractes oblong, one flowered; calyx five, cleft to the base, divisions oblong, obtuse, villous on the outside, corolla five petalled, petals oval, emarginate, broader but very little longer than divisions of the calyx, filaments from 40 to 50, short, broad inserted between the petals and the base of the germ, anthers linear with a single filiform beak; germ superior, conic, downy, three celled, cells containing 3 ovules each, attached to the top of the axis, style longer than the stamens, stigma acute, pericarpium acoriaceous, fleshy, oblong, obtuse, one-celled, three-valved capsule, general size about 2½ inches long and 1½ in diameter, seed solitary of same shape as the capsule. (*Roxb. Fl. Ind. p* 601). The substance called "East Indian copal" and sold in England as gum *animi* exudes abundantly from this tree. It occurs of all shades of color between pale green and deep yellow : the finest pieces are called *kahrobu*, Arabic Amber, and sold as *amber* in the bazars of Bengal ; the resin before it hardens is the Piney varnish of Malabar. Besides the uses already alluded to, candles are made of this resin in Malabar, which Dr. Wight informs us, diffuse in burning an agreeable fragrance, give a fine clear light, with little smoke, and consume the wick without snuffing. These candles were at one time introduced into England, but a very high duty having been imposed the trade ceased.

(7034) *Canarium commune.* (*Roxb. Fl. Ind. Vol.* iii *p.* 137.) A native of the continent of India, the Archipelago and Isle of France, where it is called "Bois de Colophane," It was brought from the Moluccas to the Calcutta Botanic garden, but in Roxburgh's time did not thrive, owing to the coldness of the winter months. The bark yields an abundance of limpid oil with a pungent turpentine smell, congealing into a buttery camphoraceous mass.

(7035) *Canarium Bengalense*, another species, yields a large quantity of very pure, clear amber-colored resin which soon becomes hard and brittle, and is not unlike copal ; yet the natives of Northern India, set little or no value upon it. In the Calcutta bazar it sells at 2 to 3 Rs. per maund of 86 lbs. It is a native of Sylhet and the adjacent mountainous countries and flowers in May and June.

The dammer of the Northern Circars is chiefly produced by the varieties of the genus Shorea. The *Shoreas* are also found growing to a very limited extent on the Western coast, but do not appear to produce much, if indeed any, of the resin collected for sale.—O'Shaughnessy, gives the following description of the

(7036) *Shorea robusta or Saul tree.* This is a tree of great size, a native of Morung, the Paulghaut mountains &c. Sepals afterwards changing into 5 long wings, petals 5, stamens 15, filaments capillary below the anthers, anther cells short, obtuse, connectum filiform, produced beyond the cells into a more or less elongated colored, deciduous bristle, ovarium 3 celled, with two pendulous ovules in each cell. Seed solitary, cotyledons stalked, not crumbled, radicle superior, leaves coriaceous, oblong, obtuse, often emarginate at the base, panicles numerous from the axils of the fallen leaves, branches and pedicels glabrous.

The *Shorea robusta*, and indeed some other species, yield abundance of the resin called dammer, the superior kinds of which are efficient substitutes for the pine resin of the European Pharmacopœiæ. Captain Jenkins of Assam forwarded specimens of this resin perfectly transparent and colorless ; in the bazars the color ranges from pale amber to dark brown. It is devoid of taste and smell. Sp. gr. 1.097 to 1.123, easily fusible, partially soluble in alcohol (83.1 per 1000), almost entirely in ether, perfectly in oil of turpentine and the fixed oils ; sulphuric acid dissolves and gives it a red color. Two parts of colorless dammer and 2½ parts of oil of turpentine, make the best varnish for lithographic drawings.

(7037) *Dipterocarpeæ.* Dr. Wight gives descriptions of the resiniferous and balsamiferous trees of India. Under the head *Dipterocarpeæ* he observes :—The trees of this order growing in Madras are all natives of the hilly tracts of the Balaghaut. In Silhet, Chittagong and Pegu where they abound, they occupy the plains. In Java one species (*Dipterocarpus littoralis*) is found on the sea shore. A *Hopea* and the *Valeria indica* also approach the coast in Malabar, but the latter, or perhaps a distinct species, is also plentiful in Mysore. Two or three species are found in Goomsur, forming extensive forests, and affording to the inhabitants incense, dammer and wood oil. Judging from the imperfect specimens collected by Dr. Maxwell and Capt. McPherson, one of them belongs to Roxburgh's genus *Shorea*, apparently *S. robusta*. Both these Gentlemen mention *Chloroxylon dupada* as being one of them, but this, Dr. Wight thinks, must be a mistake, originating in a statement of Dr. Ainslie, that this is the botanical name given to the Indian dammer tree by Dr. Buchanan, but which was an error of Buchanan's, arising from his not being aware that several trees produce dammer and that his *Chloroxylon dupada* had already been described by Linnæus under the generic name of *Valeria*. The Shoreas (Roxb.) or Vaticas (Linn) and Vaterias yield the solid product called dammer and Piney, whilst the produce of the Dipterocarpus retains its fluidity and is the "wood oil" of the bazars. The Camphor tree of Sumatra is a species of *Vatica* (*Shorea camphorifera. Roxb.*) The Vateria Indica (*Chloroxylon dupada* of Buchanan and Ainslie, and the Piney marum of the Hindoos) produces a resin resembling Copal, much finer than that procured from other species, natives of India, the finer specimens of which are as transparent as amber and nearly colorless. It is procured by the very simple process of cutting a notch in the tree sloping inwards and downwards. This is soon filled with the juice, which in a short time hardens by exposure to the air.

(7038) *Canarium.* Under the head of "*Canarium*," Wight observes,—the resinous juice of the *Canarium commune* has properties similar to Copaiva, while on the other hand the kernels of the seed afford by expression a bland edible oil. The *Canarium strictum* of Roxburgh is known in Malabar under the name of the "black dammer tree" in contradistinction to the *Vateria* which is the "white dammer tree." This tree is rather common in the Alpine forests about Courtallum in the Tinnevelly district, and is there regularly rented for the sake of its dammer. The dammer is transparent and of a deep brownish yellow or amber color, when held between the eye and the light, but when adhering to the tree has a bright shining black appearance. The flowers of the species I have not seen, the fruit is a very hard three celled oval nut tapering at each end."—*Wight, Ill.*

In the Madras Exhibition of 1857, the Jury endeavoured to identify the various products and to arrange them under their several heads.

E. J. Waring, Esq., remarks; that "the substances known as "*black dammer*," and "*white dammer*" are undoubtedly the produce of different trees. The *Black dammer* tree, he adds, appears to be the *Canarium strictum* (Roxb. Fl. Ind. Vol. iii. *p.* 138). It does not grow on the low lands of Travancore, being only found in the mountainous regions between Travancore and Tinnevelly. General Cullen, who has paid much attention to this subject, has never heard of the true Saul tree (*V. robusta*) in the Travancore forests, but the *Vatica tumbugaia* is common in Travancore, it is called Tumbagum or "Cumbagum" and at Courtallum "Congo." The *white dammer*, or vullay coonghilium of Ainslie, is, he thinks, without doubt the produce of the *Vateria indica.* I send you two specimens of the resin very different in appearance, one dense with a vitreous fracture and of a pale green color, the other very porous or vesicular of a bright amber color. I am assured by those who have the best opportunities of knowing, that they are both obtained from the *Peyni marram* or *Vateria indica*, the denser one being the natural exudation which has spontaneously hardened on the tree, and its surface you will perceive bears witness to the fact, whilst the other has been obtained by incision and subsequent exposure to the sun or fire to hasten the hardening process. All kinds of *vellay coonghilium* or white dammers that I have met with on the Western coast are referable to one of these specimens, the difference arising from the mode of collection, and perhaps depending somewhat on the age of the tree. As far as I can learn, there are no other trees in Travancore which yield dammers of any kind."

In a subsequent letter the same gentleman observes, "When last I wrote, I spoke confidenty of the white dammer being the exudation of the *Vateria indica.* From subsequent enquiries, this opinion must, I think, be slightly modified, as I am assured by one of the largest collectors of this article to the north (near Cochin) that much of the difference observed in different specimens arises from the *kind* of Piney maram from which they are obtained. The one kind he describes as having longer, narrower and thinner leaves than the common Pinney maram (*Vateria indica*). I have never seen the tree myself but probably it is the *Vateria lanceolata.* In speaking of the "white dammer tree" therefore, it would be perhaps advisable to say, "*Vateria Indica and allied species.*"

Subsequently to this, on the 18th May, in advising the committee of the transmission of specimens of the white and black dammer trees [collected personally by J. Brown, Esq., Astronomer in charge of the Trivandrum Observatory,] Dr. Waring says, "I regret that there are no flowers to the specimens of the black dammer tree, but the fruit and arrangement of the leaves at once prove that it is *not* a Dipterocarpus, and consequently *not* the *Vatica tumbugaia*, whilst at the same time it appears to me clearly to be a *Canarium.* [The specimen was identified by the Jury, as the *Canarium strictum*, Roxb.] I send you Mr. Brown's interesting letter which accompanied the specimens. Regarding these Mr. Brown writes, "It seemed to me that if there was still a doubt as to the black dammer tree," it must have been due to want of authority in the specimens produced, and thinking that I could not help you well by such proxy as I could have obtained, and as I expected to be near the base of the Ghauts and in the region of Dammer trees within a fortnight, I the more readily postponed the matter. The "black dammer tree" was in flower about the beginning of April, as far as I could guess from the seed vessels, and the white dammer tree in the beginning of May. Both trees grow in the forests here, about 1800 feet above the level of the sea, but the white dammer tree seems more common than the other, perhaps because the hill men, getting more dammer from the latter destroy it more readily. The best specimens of the *black dammer* tree which I examined were above two yards in girth at the height of four feet above the spread of the roots. The trunk is round, straight and smooth, rising 22 to 30 feet before branching, the bark generally whitish, dotted with small papillæ, peels off in long flakes. The dammer that exudes from the cuts in the trunk seems to be a great favorite of several species of insects especially of one resembling a bee, called by the Hill men "kulliada" (*earth hole*),* which live in pairs in holes in the ground. I send you specimens of the bark as well as of the black dammer taken by me from one of the trees. The Hill men to get the dammer, make a great number of *vertical* cuts into the bark, all round near the base of the trunk; they then set fire to the tree below the cuts, and having thus killed it, they leave it for *two* years before they collect the dammer, they say that after one year only the quantity of dammer is *much* less than after two years. The tree is killed in the hot season and the dammer is collected in February or March. When on the ghats previously, as well as this year, we were struck on looking towards the forests on both the Eastern and Western slopes as high as 3000 feet above the level of the sea, by numbers of trees with bright red, often crimson foliage, contrasting strongly with the various greens around. These crimson trees, are black dammer trees, the color, due to the young leaves, disappears gradually in April. The leaves of the young plants are more sharply serrated than those of the old trees, and they have tufts of hairs all around the edges, which are not visible in the leaves taken from the old trees. The *white dammer* tree has much the same *tenue*, trunk round and straight, branching at 20 to 30 feet from the ground; its appearance is however sufficiently different. The trunk of the black dammer tree is smooth and whitish: that of the white dammer tree is (in all the specimens I saw) beautifully variegated by variously colored lichens, red, white, green, and black, the latter generally prevailing. The trunk also is *dimpled* all over by the scaling off of small patches of the bark. I am told that the young leaves are also reddish but not nearly so bright as those of the black dammer tree. The white dammer is obtained in the same manner as the black dammer, but the quantity obtained from one tree is generally little more than one third of that from a black dammer tree of the same size. The quantity obtained from a black dammer tree may be about 30 to 40 dungallies. A dungally is a measure of about 2½ seers. Kistniah, Assistant supervisor of the Coimbatore district writing from Suttymungalam says:—" Both the white and black dammer trees grow in these forests, but the black are by far the most numerous being in the proportion of ten to one white dammer tree. Both trees have the same appearance, growing to the height of 10 or 12 yards of one uniform thickness, and then branching like a jack tree. The dammer is extracted from the black dammer tree by piling firewood to the height of one yard around the base of the trunk and lighting it. The dammer subsequently exudes from the trunk as high as the flames reach. The operation is conducted at any season of the year, and the dammer continues to flow for ten years between the months of April and November and is collected in January. The tree after having yielded dammer for 10 or 12 years dies. The white dammer tree is not acted on by fire but the resin exudes spontaneously, and is found at the foot of the trunk, it is not much sought after by merchants."

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* This curious circumstance will doubtless account for the mode of formation of the resin called in Burmah

The Jury remark that both the white and black dammer trees have been recognised (by the specimens) as the *Vateria* and *Canarium*, although the black dammer sent from the Travancore district to the Exhibition was erroneously attributed to the *Vatica tumbugaia* by the exhibitor. Mr. Pedre Proboo ascribes the different appearance of various specimens of this resin to the age of the tree. The most vesicular specimens, he says, are obtained from the young tree, the more compact ones from the mature plant, whilst the darkest colored kinds are obtained from the hearts of the tree when decayed and split with old age.

The Jury sum up in the following few words — The whole of the substances commonly called "DAMMERS," produced in the Madras presidency are obtained from trees of the genera *Vateria*, *Canarium, and Shorea or Vatica.* The two former viz. Vateria and Canarium, yield by far the largest part (if not the whole) of the dammers produced on the Western coast of the Peninsula, whilst the Shoreas or Vaticas yield the greater part of that collected in the northern and eastern districts.

They may be briefly arranged as follows.—

(7039) *Dammers of the Western Coast. Black Dammer.* (*Canarium strictum*), the *carpoo coonghilium* of Ainslie, the *Dammara nigra legitima* of Rumphius and the *Canari* of the Malays. This occurs in large stalactytic-shaped masses, of a bright shining black color when viewed from a distance, but translucent and of a deep reddish brown when held in thin laminæ between the eye and the light. It is perfectly homogenous, and has a vitreous fracture. Its shape appears to be due to the fact of the balsam having exuded in a very fluid state and trickled down the trunk of the tree, where it gradually hardens by exposure to the sun the fresh resin continuing to flow over that already hardened, gives rise to the stalactytic appearance of the huge lumps of resin, the outside of which much resemble the guttering of wax caused by placing a lighted candle

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"Poon-yet" and " Poey-ne-yet," specimens of which were exhibited at the Madras Exhibition of 1857, and are said to be found in the ground, and were supposed to be produced by some hymenopterous insect, it is also found in hollow trees. This substance, although composed chiefly of a yellow brittle resin mixed with more or less sand or earth, has an appearance precisely like that which would be looked for if used by an hymenopterous insect in the construction of its cells. (See classified Catalogue of the Madras Exhibition of 1857. class iv.) The Madras Exhibition of 1855 contained a substance from Malacca called "*Dammer klootee*" which had been evidently formed in the same manner, although the cells were larger and the resin blacker and harder than the Poonyet.

in a draught. It is insoluble in cold, but partially soluble in boiling alcohol on the addition of camphor: when powdered it is readily soluble in oil of turpentine. Powdered and burnt on the fire it emits a more resinous smell and burns with more smoke than white dammer. "The size of the lumps of this resin, together with its color and the peculiarity of shape already mentioned, suffice to distinguish it from other Indian resins.

(7040) *White Dammer or Piney resin* (*Vateria indica and allied species*) of Linnæus and Wight. *Choloroxylon Dupada* of Buchanan and Ainslie, the *Doopada* resin of Mysore, and the *Payanee* or *Piney* of the Malabars.

Variety No. 1. *Compact Piney resin or first sort white dammer.*

This occurs in large lumps of all shapes and varying in color on the outside from a bright orange to a dull yellow, bearing evident marks of having adhered to the bark of the tree. It has a shining vitreous fracture, is very hard and bears a great resemblance to amber. Its color internally) is of all shades, from a light green to a light yellow, the green tint predominating in the generality of specimens.—It is more soluble n alcohol than black dammer, and burns with ess smoke and a more agreeable odour.

It is easily distinguishable from all other Indian resins by its superior hardness, its colour and amber like appearance.

Variety No. 2. *Cellular Piney resin, or second or white dammer.*

This occurs either in small lumps or in large masses, generally of a shining appearance and balsamic smell. Has a very cellular structure, which is attributable partly to the mode of collection, and partly to the age of the tree. Notches being cut in the trunk of the tree loping inwards and downwards the resin collects in the cavity and is either permitted to ry on the spot, or is collected and dried by the pplication of heat. It is of all shades from light reen to light yellow or white, and is usually ranslucent. Specimens are sometimes seen, in which, from the dessication having been improerly conducted, the resin is more opaque, of dull green color and full of air bubbles, presenting the appearance of having undergone a partial ermentation. This resin may be recognised by s cellular appearance and balsamic smell—this atter however, (which is of course due to the olatile oil it contains,) is gradually lost by long eeping or constant exposure to the air. On plitting open old and decayed trees, portions f a dark colored resin, are often found having he solid consistence of first variety, but the inerior quality of the second.

(7041) *Dammers of the northern and eastern Districts.*

Variety No. 3. *Saul tree dammer.* (*Shorea robusta and other species*).*

This occurs in sticks much resembling in shape the black dammer, but differing widely in colour and consistency. In colour it varies from a light yellow to a dark brown, the two colours being very frequently blended in the same lump and giving it the appearance of having a regular "grain". It is friable and differs from the white dammer of the western coast in its inferior hardness, its opacity and its peculiar form, and from the black *dammer in its color.* An intelligent native correspondent writing from Gopalpore says, "There are extensive tracts of Googulam (*Vatica*) jungles in the Goomsur and Cuttack provinces. The Khoonds and Woodias living in and near these jungles wound trees in several places. The resin issues and is collected when sufficiently solid. The Dammer collected from the decayed parts of the tree is of a dark color, the tree is called "Guggilam" in Telugu and "tala gotso" in Urya. The Khoonds and Uryas make these leaves into the plates from which they eat their food, and also roll up tobacco in them to smoke like a cheroot. In time of famine the above tribes live on a soup made from the fruit of this tree.

(7042) *Lac.* The specimens exhibited, consisted of, *Lac*: Good *stick lacs* were shown from Malabar, Bellary, Mangalore and Pegu Also an excellent series of stick, seed, and shell lac, with the dye from Mirzapore, Kymoor and Hazarebaugh jungles, from Cland H. Brown Esq., for which honorable mention was awarded.

(7043) *Piney resin, or white Dammer* (*Vateria Indica*). Of the many specimens exhibited the best was that shown by E. B. Thomas, Esq. of Coimbatore. It had the amber like appearance of the best description of Vateria resin. Another specimen closely approaching to this in quality was exhibited by Pedre Proboo of Mangalore. He also exhibited a series of specimens of this resin of various qualities and a cake of the inspissated juice of the same tree, which is used for mixing with bees wax in making candles.

Mr. Bassano, tahsildar of Wynaad, exhibits a bottle of the fresh resin, or as it is called Pynie *varnish.* It is of a light grey colour, with a strong balsamic odour. The Tahsildar of Walloo-wynaud in Malabar forwarded another series, varying in color from white to black. The Exhibitor observes that the resin which first exudes is called "*Chengilium*" (this is white), that which flows subsequently is termed "*Coongilium*" (darker than the above), and when dried it is called *Dammer* (black.) He describes the three sorts as being the produce of the Paynee tree (*Vateria*).

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* The Vatica tumbugaia grows also to a limited extent on the West coast, but yields little if any of the dammer llected there.

(7044) *Doona*, Mr. Thwaites of the Government Botanical Gardens at Paradenia in Ceylon exhibited a fine specimen of *Doona dammer*, obtained from a Dipterocarpus tree discovered by the exhibitor and named by him *Doona Zeylanica.* This highly interesting product, in color and appearance much resembles pine resin.

(7045) *Poon-yel.* Specimens of this curious substance were exhibited by Dr. Cleghorn and the Honorable W. Elliot, Esq. They were brought from Burmah and are said to be produced by a species of hymenopterous insect in holes in the ground and hollow trees. Indeed the cellular structure of the specimens much resemble that of a wasp's nest. A circumstance so unusual rendered the Jury at first somewhat incredulous of the correctness of this statement, but in the course of the investigations into the origin of the dammers of the western coast, it was incidentally mentioned that a species of bee appeared exceedingly fond of the liquid dammer of the *Canarium*, this insect lives in holes in the ground and it will probably be found on inspection that its cells are composed of a similar substance to that now under consideration.

(7046) *Kino* (Pterocarpus marsupinm.) The several specimens of kino at the Exhibition, said to be the produce of the Pterocarpus marsupium agreed in being but slightly astringent, of a vitreous fracture and very deep red color approaching to black. The finest specimen was that exhibited by Dr. Waring, run in a bamboo.

(7047) *Dragon's blood*, specimens of dragon's blood one in lump and one in reed, neither astringent.

(7048) *Palas or Dhak kino.* (*Butea frondosa.*) Shown by several exhibitors.

(7049) *Dikkamalay* (*Gardenia*). Gardenia resins.

(7050) *Benjamin.* Of two excellent specimens of Benjamin, that of Siam appears to be superior in fragrance to the Sumatra product, although both possess a delightful aroma, they are of the amygdaloid kind, the latter being almost entirely composed of agglutinated white tears.

(7051) *Gunda feroza* (*Boswellia thurifera.*) Is largely used in some parts of India as an application to indolent ulcers and wounds and is supposed to form the chief ingredient of "Wroughton's ointment." It has the odour, taste and consistence of a balsam.

(7052) *Theetsee.* (*Melanorrhœa usitata*). The celebrated *theetsee* dammer was exhibited by Dr. Brandis from Pegu and Capt. Benson from Moulmein. The latter exhibitor also forwarded a half log of the tree which is probably the first ever imported into Madras.

(7053) *Gamboge.*

(7054) *Xanthoxylon triphyllum.* A very small quantity of the resin obtained from this tree was exhibited by the Rev. Mr. Johnson of Cottyam. Judging from the specimen it appears to be produced in too small quantities to be useful in a commercial point of view, but the jury awarded honorable mention for the carefulness of the exhibitor in identifying the plant and supplying the correct botanical name of this new product.

(7055) *Googool.* This gum resin, is chiefly used as a medicine.

(7056) *Gum Elastis.*

(7057) *Moringa gum* much resembles tragacanth, although its partial elasticity has caused it to be classed amongst the elastics. No use is known for this abundant product.

(7058) *Gums properly so called.*
(7059) *Acacia gum.*
(7060) *Ægle marmelos.*
(7061) *Cashew tree gum.*—(*Anacardium occidentale*).
(7062) *Azadirachta Indica.*

(7063) *Kuteera.*—The produce of the *Cochlospermum gossypium* much resembles tragacanth.

(7064) *Wood apple gum.*—(*Feronia elephantum.*) This is one of the best gums included under the general name of *gum arabic.*—*Lieut. Hawkes, Reporter on Sec.* 1, *Class* IV : *M. E. of* 1857

(7065) RHAMNACEÆ, a natural order of Exogenous Plants, remakable for having a valvate calyx, hooded petals, opposite to which their stamens are inserted into the tube of the calyx, and a superior or half inferior fruit which is either dry or fleshy. The species are found nearly all over the world, except in the arctic zone. The chief number of species is said to be dispersed through the hottest parts of the United States, south of Europe, north of Africa, Cape of Good Hope, and Australia. They are all shrubs, with small greenish or inconspicuous flowers.

The species which, are best known in Great Britain are the *Rhamnus frangula*, Alder ; *R. catharticus*, Buckthorn ; *Paliurus Australis*, Christ's Thorn ; and Buckthorn ; the evergreen *Rhamnus Alaternus.* The useful species are of some importance :—*R. catharticus* and several others have purgative berries ; *R. infectorius* yields the French berries of the shops employed for dyeing yellow ; the fruit of the Jujube, *Zizyphus Jujube* and *Z. vulgaris*, is sub-acid and eatable, and the species are cultivated for it in the south of Europe and the temperate parts of Asia ; *Z. Lotus* gave its name to the Lotophagi, or Lote-Eaters, of Africa ; and *Rhamnus frangula* is extensively cultivated for the manufacture of charcoal. *Ceanothus Americanus* yields the New Jersey Tea. [Ceanothus ; Hovinia ; Paliurus ; Rhamnus.]—*Eng. Cyc.*

(7066) RHAMNUS (the word is Greek, Ραμνος), a widely diffused genus of Plants, the type of the natural family *Rhamnaceæ*. It is chiefly found in the temperate parts of Europe, in Siberia, and in the Himalayas at elevations of 6,500 feet; also in the New World, and at the Cape of Good Hope.

The genus is characterised by having an urceolate 4-5-cleft calyx; petals wanting, or emarginate; anthers ovate, 2-celled; disc thin, overspreading the tube of the calyx; ovary superior, 3-4-celled; styles 3 or 4, distinct or united; fruit fleshy, with 3 or 4, or in consequence of abortion, 2 fibrous indehiscent stones.—*Eng. Cyc.* The juice of the unripe fruit of *Rhamnus infectorius, cathartícus* and *virgatus*, known as Turkey or French berries, is used for dyeing leather yellow. When mixed with lime and evaporated to dryness, it forms the color called sap-green. A great quantity of yellow berries are annually shipped from Constantinople; 115 tons were imported into Liverpool in 1853. The average annual imports into the United Kingdom are about 450 tons. They come from the Levant in hair bales weighing three and a quarter cwt., or in tierces of four to five cwt., and are used by calico printers for dyeing a yellow color. They are sometimes called Persian berries. It is a subject of surprise that the common betel-nut of the East has never been introduced for dyeing purposes.—*Simmonds*. Dr. Wight, in Icones, gives Rhamnus hirsutus, 978; Wightii, 159: *Zeylanica*, 1899.

(7067) RHAMNUS: *Species*. The GREEN DYE RHAMNUS. While upon the subject of Chinese dyes, says Fortune, I shall now give some account of the "green indigo," which has been ttracting much notice lately both in India and in Europe. A portion of cotton cloth obtained in China by the French manufacturers being greatly dmired on account of the peculiar green of s dye, was submitted to the celebrated chemist, M. Persoz, with a request that he would endeavour o ascertain the composition of the green coıur. The following is a translation of his eport upon this subject to the Academy of ciences:—Every attempt that I made upon e specimen to detect evidence of the presence of a blue or yellow failed, and I was led o the conviction, by isolating the coloring principle, that the green was produced by a dyeing aterial of a peculiar nature and sui generis. It rther was evident,

1st.—That the coloring matter was an orgaic product of vegetable origin.

2nd.—That the fabric on which it was fixed as charged with a strong dose of alum and a ttle oxide of iron and lime, bodies the presence which necessarily implied that mordants had een used in dyeing the calico.

These results were so positive, and at the same me so opposed not only to everything known in Europe regarding the composition of green colour, but also to all that is recorded by writers regarding the dyeing processes employed in China for the production of green, that I was induced to go into a more detailed investigation of the subject; and about the end of last November I applied to Mr. Forbes, the American Consul at Canton, for some of this valuable material. I am indebted to his kindness for a specimen weighing about one gramme (15½ grains). The substance is met with in thin plates of a blue colour, having a strong analogy with that of Java indigo, but of a finer cake and differing besides from indigo both in its composition and in all its chemical properties. On infusing a small fragment of the substance in water, the liquid speedily became coloured of a deep blue with a shade of green. After the temperature had been raised to the boiling point, a piece of calico, prepared for printing with mordants of alum and oxide of iron, was dipped in it and a true dye was the result. The following appearances were observed. The portion of the fabric to which alum had been applied showed a deep green, of more or less intensity, according to the strength of the mordant. The portions charged with both alum and oxide of iron yielded a deep green, with a shade of olive. The portions charged with oxide of iron alone yielded a deep olive. The parts of the cloth where no mordant had been applied remained sensibly paler. The colours thus obtained were treated with all the re-agents to which the Chinese calico had in the first instance been subjected, and they behaved in precisely the same manner. From these experiments it may be inferred,

1st. That the Chinese possess a dye-stuff presenting the physical aspect of indigo, which dyes green with mordants of alum and iron.

2nd. That this dye stuff contains neither indigo nor any thing derived from that dyeing principle. Mons. Legentil, President of the Chamber of Commerce of Paris, having perceived the importance of France being speedily put in possession of this valuable material, with a view to the interests of science and of industry, took the necessary steps several months ago for procuring a suitable quantity with the least possible delay, and at the same time to have inquiries made as to its origin and mode of preparation.

Mr. Fortune here adds, that the investigation of the green dye-plant exhibits as many amusing blunders as used to be made about the Chinese ricepaper plant in former days. By some, the flowers of the Whi-mei (Sophora japonica) were sent home as the "green indigo," but this plant yields a yellow dye and even when mixed with blue to make a green, the green is not that kind noticed by the French manufacturers. At another place he says, here I found fields under cultivation with a kind of Rhamnus apparently. The Chinese farmer called it "Loh-zah, or "Soh-loh-shoeo" and showed me samples of the cloth which had been dyed with it. To my delight these samples corresponded exactly with those sent back from France, one of which was in my possession, but he told me that two kinds were necessary—namely the variety they cultivated in their fields and one which grew wild on the hills—in order to produce the dye in question. The former they called the yellow kind and the latter the white kind. The dye itself was not extracted by them they were merely the growers and therefore I could get no information as to its manufacture. I however secured a good supply of plants and seeds of both kinds, which were afterwards sent to India and England. My further inquiries on the subject of the manufacture of the "green indigo" were conducted in connexion with Dr. Lockhart and the Rev. J. Edkins, of Shanghae. We found that a considerable portion of this dye was made near a city called Kia-hing-foo, situated a few miles west from Shanghae and Mr. Edkins procured a bundle of chips there which exhibited the state in which the article is sold in the market. Since I left China I have received the following interesting letter from Dr. Lockhart, which throws much light on the subject. The information was procured by Mr. Edkins and may therefore be fully relied upon. "The bark of two kinds of the tree known as the 'green shrub' (Luk-char), one wild which is called the white and another cultivated, which is called the yellow, are used to obtain the dye. The white bark tree grows abundantly in the neighbourhoods of Kea-hing and Ningpo; the yellow is produced at Tsah-kou-pang, where the dye is manufactured. This place is two or three miles west from Wang-steen, a market-town situated a little to the south of Kea-hing. "The two kinds are placed together in iron pans and thoroughly boiled. The residuum is left undisturbed for three days, after which it is placed in larger earthenware vessels, and cotton cloth, prepared with lime, is dyed with it several times. After five or six immersions the colouring matter is washed from the cloth with water, and placed in iron pans to be again boiled. It is then taken upon cotton yarn several times in succession and when absorbed in this way it is next washed off and sprinkled on thin paper. When half dry the paper is pasted on light screens and strongly exposed to the sun. The product is called Lukkaou. In dyeing cotton cloth with it ten parts are mixed with three parts of subcarbonate of potash in boiling water. "The dye made at Tsah-kou-pang is not used to dye silk fabrics, because it is only a rough surface which takes it readily. To colour silk with it so much of the material must be used that it will not pay. All cotton fabrics, also grass cloths, take the colour readily. The dye does not fade with washing, which gives it a superiority over other greens. "It is sent from Kea-hing as far as Shan-ting. It is also made in the province of Hoonan and at Ningpo, but the dye at these places is said to be of an inferior quality. It has long been used by painters in water-colours, but their application of it to dye cloth was first made only about twenty years ago. If some method could be discovered of applying it to silk fabrics it would become still more useful." The information obtained by Mr. Edkins on this subject is, no doubt, perfectly correct. It agrees in the most important particulars with what I had gleaned from time to time amongst the Chinese in various parts of the country. The chips he brought with him from Kea-hing were identical with the "Soh-loh," or "Loh-zah" (Rhamnus sp.) which I have already mentioned, and his statement that two varieties of the plant are used to produce the dye agrees with my own observations. The mode of extracting the dye from the bark or wood (for both seem to be used), as practised by the Chinese, appears to be slow and tedious, but with our superior knowledge of chemistry this might possibly be improved. From these investigations it would appear that two colouring principles are necessary to the production of this dye. This however, will not affect the value of it as a rich and permanent green, a quality which has been appreciated by the French manufacturers, and which is also well known to the Chinese.—*Fortune's Res. among the Chinese, p.* 167. At another place he mentions that the *Rhamnus* producing the green indigo (so called) has been discovered and introduced both to England and to India.—*Fortune's Res. among the Chi. page* 146. The probability of this discovery proving correct, is supported by the fact that it is from one of this genus, the *Rhamnus catharticus* of Europe that the pigment called Sap green or Bladder-green is obtained. Voigt gives *Rhamnus* incanus and R. Virgatus.

(7068) RHAMNUS CATHARTICUS (called also *Spina cervina*, hence Buckthorn), indigenous shrub, with opposite branches, spreading, straight, round, smooth, hard, and rigid, each terminating in a strong spine after the first year. Leaves deciduous, bright green, smooth, ribbed, the young ones downy. Flowers yellowish green on the last year's branches numerous; the fertile ones with narrow petals, rudiments of stamens and a deeply 4-cleft style; barren ones with an abortive ovary, and broader petals. It flowers in May, ripening its berries in September, at which time they are collected. The berries are about the size of a peppercorn, black externally but within of a deep violet, the pulp inclosing three or four seeds. The taste is nauseous and repulsive at last, though at first sweetish and only bitter. They contain a peculiar extractive a colouring principle, acetic acid, and gum. The fresh and dried berries, the expressed juice, or a syrup prepared from them, all possess purgative properties, exemplified in that form which has led to the designation 'hydragogue.' Its action is attended with much sickness, griping and thirst. It should be restricted to the arts, in which it is serviceable, being the source of the pigment called Sap-Green or Bladder-Green. —*Eng. Cyc.*

(7069) RHAMNUS FRANGULA, Alder Buckthorn, has alternate branches and elliptical. It is a native of the British Islands.—*Eng. Cyc.*

(7070) RHATANY ROOT. Is derived from the *Krameria triandra*, and consists of cylindrical ramifications, varying in size from that of a quill to a finger. It is obtained from Peru, and is used as an astringent medicine.—*Waterton.*—*Faulkner.*

(7071) RHEUM, a genus of Plants belonging to the natural order *Polygonaceæ*, of which the name is taken from the Ῥέον of Dioscorides, and which includes the different species of plants which yield the stalks and root so well known by the name of Rhubarb. It is doubted by some whether the root to which the name rha' and 'rheon' was applied by the Greeks was the same as that to which we now apply the name of rhubarb, because the descriptions of the ormer given by Dioscorides and Pliny do not pply to the latter. It is admitted however that ur rhubarb was known to the later Greek phyicians, as Alexander of Tralles and Paulus of Egina, and there is no doubt that the Arabs were well acquainted with it; and it is remarkable hat they quote 'rheon' as the Greek synonyme f their 'rawund,' which is rhubarb, and which hey describe as being of various kinds, as Inian, Turkish, Chinese, and from Khorassan. rom this it is probable that one kind may have ecome substituted for another as the communiation with the east increased. Long as the Rhubarb root has been known, it is remarkable hat the species of *Rheum* yielding it is yet unnown; this is in consequence of the best rhuarb, Turkey rhubarb, being only obtained by he Russians at Kiachta from the Chinese. That alled Chinese may be the produce of the same, r of a different species, from the northern boundaries of that country. Dr. Royle, after reviewing the different accounts of the commerce f rhubarb, states :—"This would bring the hubarb, country, within 95° of E. long, in 35 N. lat., that is, into the heart of Tibet. s no naturalist has visited this part, and neither seeds nor plants have been obtained hence, it is as yet unknown what species yields his rhubarb plant." Sievers had previously aid that his travels had satisfied him that as yet nobody, that is, no scientific person, has seen he true rhubarb plant. The Himalayan and ersian rhubarbs have alone been ascertained. he different species of rhubarb are important lants, not only on account of the roots being so extensively employed, and so valuable for their medicinal qualities, but also on account of the stalks of the leaves being now so much employed, from their agreeable acidity, in making tarts, &c. As the species are all indigenous in cold parts of the world, that is, from the southern parts of Russia, Siberia, Tibet, the north of China, and the Himalayas, so they may all be grown in the open air of Great Britain and several are cultivated on account of their stalks. Some also, both in England and France, are cultivated on account of their roots, often for the purpose of adulteration. The genus *Rheum* is characterised by having an inferior petaloid sexpartite calyx, into the bottom of which the stamens, about nine in number, are inserted; anthers opening lengthwise; ovary superior, with a single erect ovule; styles 3, reflexed; stigmas peltate, entire; fruit (achenium) 3-cornered, winged, with the withered calyx at the base. The species which are known and cultivated are the following:—(Royle, *Illustr. Himal. Bot.*; Lindley, *Flora Medica*; Pereira, *Elements of Materia Medica.*) *Eng. Cyc.*

(7072) RHEUM, CASPICUM, Fischer (*R. rhaponticum*, Ledbour); in the Altai Mountains. Leaves ovate, acuminate, obtuse, cordate, inflexed at the base, thick, very wavy, glossy on the upper but slightly downy on the under side. Petiole pale green, minutely downy.—*Eng. Cyc.*

(7073). RHEUM COMPACTUM, Linn.; Tartary and China. Leaves heart-shaped, obtuse, very wavy, deep green, thick, quite smooth on both sides, glossy on the upper. Sinus nearly closed with parenchyma. Petiole green.—*Eng. Cyc.*

(7074) RHEUM CRASSIVERNIUM, Fischer. Leaves heart-shaped, acuminate, obtuse, wavy, bullate, deep-green, quite smooth, rather glossy above; ribs slightly coloured red, the centre ones above half an inch deep at the base. Petiole dull red, rounded, rather angular.—*Eng. Cyc.*

(7075) RHEUM EMODI, Wallich, *R. australe* of Don, is found in Kumaon. The root is a valuable medicine, though bearing hardly any resemblance to that of the shops. Stems much branched, six to ten feet high, very thick below, gradually diminishing, and spreading into large panicles, and these rough, with minute warts. Leaves very large, cordate, acute, dull-green, but little wavy, very rough, covered with little hairs. Petioles very rough, furrowed, and very much narrower at the upper than the lower end. Panicles terminal, very long. Flowers blood-red, very small.—*Eng. Cyc.* Honigberger mentions that *Rheum Australe* Don, *Rheum Emodi* Wall, vegetates in wild luxuriance on the Cashmerian mountains. It is considered as one of the best rhubarbs; notwithstanding the coarse appearance of its exterior.

The best of all is, it can be had fresh and cheap in any quantity, and at any time Besides, it must necessarily have its own peculiar properties, such as are not to be found in any other sort of rhubarb.—*Thirty-five years in the East, by Dr. Honigberger*, *p.* 335.

(7076) RHEUM LEUCORHIZUM, Pall (*R. nanum*, Sievers; *R. tataricum*, Linn.). A small plant though said to be equally efficacious with the best sorts. Radicle leaves about three, short-stalked, from four to six inches long, and from five to nine inches broad; smooth on both sides, tooth-letted at the edge. Flowering stem about two inches high when in flower, afterwards becoming ten to twelve inches high.—*Eng. Cyc.*

(7077) RHEUM MOORCROFTIANUM, (Royle), Small-Stalked Rhubarb, leaves and stems covered with short pubescence; petioles deeply furrowed; the stipules as long as the petioles and very membranous; scales at the base yet longer, extremely thin, and towards the summits much torn. This species was found by Messrs. Moorcroft and Hearsay near the Niti Pass in the Himalayas, at an elevation of 12,000 feet.—*Eng. Cyc.*

(7078) RHEUM PALMATUM, Linn., generally thought to be the source of the true officinal rhubarb; near the great wall of China. Leaves roundish, cordate, half palmate; the lobes pinnatifid, acuminate, deep dullgreen, not wavy, but uneven and very much wrinkled on the upper side, hardly scabrous at the edge, downy on the under side. The flowering stems are taller than those of any other species.—*Eng. Cyc.*

(7079) RHEUM RHAPONTICUM, Linn; north of the Caspian. According to Guibour, cultivated largely near Lorient, in the department of Morbihan in France, at a place called from that circumstance Rheumpole. Leaves roundish, ovate, cordate, obtuse, but little wavy, very concave, even, very slightly downy on the under side. Panicles very compact and short, always rounded at the ends, and never lax. *R. rhaponticum*, *R. hybridum*, R. *compactum*, and hybrid varieties of them, are the common garden rhubarbs.—*Eng. Cyc.*

(7080) RHEUM RIBES seems to be so named from the Persian name Ribas, which is as frequently written Rewash, and which Elphinstone, Burnes, and other travellers notice as being highly esteemed by the Persians, and of which the stalks are prepared in a variety of ways, and considered a great delicacy.—*Eng. Cyc.*

(7081) RHEUM SPICIFORME, Royle, 'Illust.,' t 78, found on the northern face of the Himalayas. Leaves thick, leathery, cordate, blunt, red and netted beneath, and covered with stellate down on each side. Pedicels numerous, clustered, as long as the ripe fruit. The roots are lighter coloured and more compact than those of *R. Emodi*.—*Eng. Cyc.*

(7082) RHEUM UNDULATUM, Linn. (*R. rhubarbarum*, Linn.), China and Siberia. Leaves oval, obtuse, deep green, with veins purple at the base, often shorter than the petiole, downy on each side when young, looking as if frosted. Petiole downy, blood-red, semi-cylindrical.—*Eng. Cyc.*

(7083) RHEXIA VIRGINICA. *Melastomaceæ*. This is a genus of shrubby plants, handsome when in flower, they require a good soil. and may be propagated by seed or dividing the roots, colours are purple, pink and white.—*Riddell.*

(7084) RHEUM WEBBIANUM. Royle 'Illust.,' t. 99.; *R Emodi* of Meisner, found by Mr. Moorcroft at the height of 12,000 fee above the level of the sea, and by Dr. Royle o the Choor Mountain. Root leaves large, long stalked, rather downy above, veiny beneath margin hairy. Axillary racemes clustered, terminal, panicled; pedicels in threes, twice as short as the ripe fruit.—*Eng. Cyc.*

(7085) RHINACANTHUS (from ρίν, a snout and ἀκάνθα, a thorn), a genus of Plants belonging to the natural order *Acanthaceæ*. It has a regularly 5-parted calyx with small subulate bract and bractlets; a hypocrateriform 2 lipped corolla, with a long slender tube, the uppe lip narrow, the lower trifid, with equal segments; 2 stamens inserted in the throat o the corolla, the anthers 2-celled, awnless, with one cell placed above the others almost in a line a clavate capsule much compressed at the base with the commissure of the valves in contac and seedless; the upper part 4-seeded, or b abortion 2-seeded; the dissepiment complete adnate; the seed ovate, bi-convex, augmente with hooks which are concave and obtuse.—*Eng. Cyc.*

(7086) RHINACANTHUS COMMUNIS *Syn.* JUSTICIA NASUTA, WHITE-FLOWERIN JUSTICIA. Linn. *Roxb. Flora Indica*, i. 120. *Rheede*, ix. t. 69.

Pulcolli, RHEEDE.
Kabooter ke jur HIND.
Jooi pance, BENG-

Naga mulli, TEL. an
TAM.
O'Shaughnessy, *p*

Rhinacanthus Communis, is a native of th continent of India, with opposite stalked broad lanceolate obtuse leaves, above smooth, belo a little downy, entire, from two to four inche long and from one to two inches broad, and fleshy ring surrounding the base of the ovar The roots of this plant are boiled in milk, an are reckoned by the natives of India as aphro disiac. In conjunction with lime-juice and pep per they are used as an external application fo ringworm. (Lindley, *Flora Medica.*)—*Eng. Cy* It is used also for the bites of venomous snake hence the Telinga and Tamul name Naga mull or jasmine of the cobra capella. "Naga," s

Roxbugh informs us, is prefixed to most of the native antidotes, and occurs very often in their writings,—"like the ancient physicians of Greece and Rome those of India at this day make poisons and their antidotes a very chief part of their studies, but from the seeming inactivity of a very large share of them, we may safely conclude that their practice is equally frivolous with that of the ancients, and ought to be discouraged as much as possible, because at least they prevent the application of more efficacious remidies."—*O'Shaughnessy, page* 481. R. Communis grows spreading along the ground (*Riddell*) ; and is found in the native gardens as a flower. The flowers are sold along with those of Jasmine and the root used in medicine as an excitant.—*Gen. Med. Top. p.* 173.

(7087) RHINOCEROS (the Greek Ρινοκέρως), the name of a genus of Pachydermatous Quadrupeds, placed by Linnæus in his order *Bruta* ; and by Illiger in his order *Mullungla*, family *Nasicornia*. It has been a question whether one of the species, *Rhinoceros unicoris*, Linn. (R. *Indicus*, Cuv. and Desm) is not the ראמ (Reem), or רימ· (Rem), of Scripture (Numb. xxiii. 22 ; xxiv. 8 ; Deut., xxxiii. 17 ; xxxix. 9 10 ; Psalms, xxii. 21 ; xxix 6 ; xcii 10 ; Isaiah xxxiv. 7). In the Septuagint the word is translated Μονοκέρως, or Unicorn, except in Isaiah, where it is rendered ' Αδροὶ (or the mighty or powerful ones). In the Trigurine and Vulgate versions the word is rendered (Numb., xxiii 22 ; Job xxxix. 9, 15) Rhinoceros, with a note to the former, that others read Monoceros ; and in Schenchzer's 'Physica Sacra' we have (Tab. 313) Numb., xxiii. 22. illustrated by a somewhat extravagant and exaggerated figure of a one horned Rhinocerous, with "Reem : Rhinoceros" below the plate. In the Bible "Imprinted at London by Robert Barker, Printer to the King's most excellent Majestic" ('Breeches Bible), the word used is 'Unicorn ;' and 'Unicorn' is the expression in the version now in use in our churches. Some are of opinion that the Reem, or Reim, of Scripture were savage animals of the Bovine genus, and others that the word signified the Oryx, observing that Reem is the Arabian name or a species of wild-goat or gazelle. These allege that the Reem was two-horned. (Deut. xxxiii. 7 ; Psalms, xxii 21.) The better opinion seems to be that the animal or animals intended to be designated in most of the passages quoted, if not in ll, was or were the *Rhinoceros unicornis*, or Great Asiatic one-horned Rhinoceros. M. Leson expresses a decided opinion to this effect ; and indeed the description in Job (chap. xxxix) would almost forbid the conclusion that any animal was in the writer's mind except one of surpassing bulk and indomitable strength. It has also been doubted whether accounts of the Indian Ονος ἄγριοι (Wild Asses) given by Ctesias 'Indic.,' ed Bahr) were not highly coloured and exaggerated descriptions of animals of this genus, and whether the Ονος Ινδικός (Indian Ass) of Aristotle was not a Rhinoceros.

The osteology of the various species of *Rhinoceros* differs very considerably. The following differences appear on examining the skull of the two-horned species of the Cape :—1. On its upper surface the horizontal contour of the bones of the nose is rounded in the Cape species, and almost extravagantly so in *R. simus*, whilst in the one horned species it is pointed. 2. The principal differences in the profile relate to the form of the incisive bones, which in *R. Indicus* advance as far as the bones of the nose, and have above a particular apophysis : in *R. Africanus* and *R. simus* the incisive bones are each reduced to a small oblong piece. 3. On the lower surface, besides the differences which result from the form of the zygomatic arches, the direction of the occipital crest, and that which the difference of the incisive bones produces on the front of the palate, it may be observed that the series of molars is longer in *R. Africanus* and *R. simus*, and that it converges anteriorly with that of the opposite side. 4. The posterior surface is demi-elliptical, and higher than it is wide in *R. Indicus*, and rather wider than it is high in *R. Africanus* and *R. simus*, in which last the occipital foramen is wider than it is high, whilst in *R. Indicus* those proportions are reversed. The principal differences of the lower jaws are (besides the length which precedes the molars, which is much less in *R. Africanus* and *R. simus* than in *R. Indicus*), 1st, that the series of molars is longer in the African species ; 2nd, that the rising branches are much less high ; 3rd, that the coronoid apophyses are much shorter, less pointed, and less directed forwards ; 4th, that the dental branches are much more convex, externally. The One-Horned Rhinoceros of Java (*R. Javanus*) resembles less, in the bones of the extremities, the *R. Indicus*, than does the *R. Africanus ;* which, as Cuvier observes, is remarkable. But in the skull the resemblance to that of *R. Indicus* is striking, though there are still remarkable differences. The whole cranium, for instance, is less, and the zygomatic arches, the orbits, and the nasal bones, which terminate in a sharp point, are less developed. We now proceed to give some account of the species of *Rhinoceros* :—*Eng. Cyc.*

(7088) RHINOCEROS AFRICANUS. Cuv. (*R. bicornis*, Linn.), is of a pale yellow brown ; horns unequal in length ; neck surrounded with a furrow at the setting on of the head ; eyes brown. Length 10 feet 11 inches. (Smith) The hide is pale yellowish-brown, with tints of purple upon the sides of the head and muzzle ; the groins flesh-coloured ; eyes dark brown ; the horns livid-brown clouded with green ; the hairs on the tip of the tail and the margins of the ears deep black.—*Eng. Cyc.*

(7089) RHINOCEROS INDICUS (*R. unicornis*, Linn.) has a single horn on the nose. Skin naked, very thick, of a dull deep purplish-gray, marked with sub-elevated, rounded, and other inequalities, and remarkable for the deep folds which it forms behind and across the shoulders, and before and across the thighs, &c. There are a few stout, stiff, horny, and smooth hairs on the tail and on the ears. The species inhabits the East Indies, especially beyond the Ganges. It is recorded as having been found in Bengal, Siam, and Cochin-China. Shady forests, the neighbourhood of rivers, and marshy places are favourite localities. Their ordinary food consists of herbage and the branches of trees. The flesh is said to be not unpalatable. —*Eng. Cyc.*

(7090) RHINOCEROS JAVANUS. (Cuvier) has one horn; folds of neck obsolete; scutules of the skin angled at the margin, concave in the middle, and furnished with a few short bristles; margin of the ears and under side of the tail hairy. The marks of distinction afforded by the folds of the external covering were less evident than those afforded by the form of the body and the attenuated head; but the folds on the whole appeared less rough or prominent than in *R. Indicus*. This animal is gregarious in many parts. Dr. Horsfield states that it is not limited to a particular region or climate but that its range extends from the level of the ocean to the summit of mountains of considerable elevation. Dr. Horsfield noticed it at Tangung, near the confines of the Southern Ocean, in the districts of the native princes, and on the summit of the high peaks of the Priangan regencies. It prefers high situations. This species is the Warak of the Javanese, the Badak of the Malays and of the inhabitants of the western parts of Java. (Horsfield, 'Zoological Researches in Java.')—*Eng. Cyc.*

(7091) RHINOCEROS KEITLOA (Smith) is of a pale brownish-yellow colour; the two horns subequal in length, the anterior one cylindrical, the posterior one compressed; anterior part of the upper lip produced and acuminate. Dr. Smith remarks that the only species yet known with which the present could be confounded is the *R. bicornis* of authors There are however, he observes, many and marked differences between them, of which the following are a few of the external and more palpable ones. In *R. Keitloa* the two horns are of equal or nearly equal length; in *R. Africanus* the posterior in neither sex is ever much beyond a third of the length of the anterior horn; the length of the head in proportion to the depth is very different in the two.

(7092) RHINOCEROS SUMATRENSIS, Cuv. (*R. Sumatranus*, Raffles), has four great incisors, as in the two preceding species, but hardly any fold on the skin, which is hairy; a second horn behind the ordinary one. The first satisfactory indication of the existence of this species occurs in Pennant, who imagined that the two-horned species of Sumatra was identical with *R. bicornis*, the only African species then known. He quotes the following remark of Mr. Charles Miller, who was long resident in Sumatra:—" I never saw but two of the two-horned Rhinoceros; but I believe they are not uncommon in the island, but are very shy, which is the reason they are but seldom seen. I was once within twenty yards of one. It had not any appearance of folds of plaits on the skin; and had a similar horn resembling the greater, and, like that, a little turned inward. The figure given by Dr. Sparrman is a faithful resemblance of that I saw

The hide is rugose, covered with scattered stiff brown hairs; folds on the shoulders and croup but slightly marked; the skin generally rather delicate, and nearly without folds; head rather elongated; eyes small and brown; upper lip pointed and curved downwards; ears small and pointed, fringed with black short hairs; first horn bent backwards, second smooth and pyramidal, placed a little in front of the eyes. It is a native of Sumatra.—*Eng. Cyc.*

(7093) RHINOCEROSES FOSSIL. The Fossil Rhinoceroses hitherto discovered may be divided into three groups—3, those with a true or bony septum narium; 2, those without a bony septum; and 4, those with incisor teeth. The greater portion of remains found in Northern and Central Europe and Asia belong to the first group; those found in Italy belong to the second. The skulls of the Rhinoceroses belonging to the first group exhibit an essential difference when compared with those of the living species. Those of the former are longer and narrower in proportion; the width between the orbits is less; the bones of the nose are more elongated; the disc on which the anterior horn was seated is an oblong ellipse, whilst in *R. bicornis* it is a hemisphere. An analogous elongation exists in the place where the second horn was situated, whence Cuvier concludes that the horns of the Rhinoceros with a bony septum narium were very much compressed laterally. The same great zoologist remarks that in *R. bicornis* or *R. Africanus* (Cape Rhinoceros) the occipital crest is nearly over the occipital condyles, and the posterior surface of the occiput is nearly perpendicular to the axis of the head. In *R. Javanus* this surface is inclined forwards, which renders the distance from the nose to the crest shorter than that from the nose to the condyle in a proportion of 19 to 25.—*Eng. Cyc.*

(7094) RHIZOPHORACEÆ, *Mangroves*, a natural order of Exogenous Plants, natives of the shores of the tropics, where they grow in the mud, and form a close thicket down to the verge of the ocean. They are trees or shrubs, with simple opposite leaves, having deciduous interpetiolary stipules. The calyx is adherent, with 4-12 valvate lobes; petals 4-12: stamens twice or thrice as many; ovary 2-4-celled, with two pendulous ovules in each cell. The fruit is monospermal, indehiscent, crowned by the calyx. Seed exalbuminous, embryo germinating in the pericarp. There are 21 species and 5 genera. The bark of the trees is usually astringent, and is employed in tanning and as a febrifuge. The wood of several is described as being hard and durable.—*Eng. Cyc.*

In the West Indies, cordage is made of the bark of a species of Mangrove, which is hence called Rope Mangrove. The coasts of the Bay of Bengal and of the Indian islands abound in the Mangrove, which is found also at the mouths of the Indus. Its bark has been used for tanning purposes, for which it is probably more suitable than for cordage.—*Royle. Fib. Pl. p.* 301. The bark of a small Mangrove tree *Kandelia Rheedii* from he mangrove swamps is used by the Tavoy vomen in dying red, but Mason thinks as a mordant.—*Mason* The following species of *Rhizophora* are the best known forms of the order:—

(7095) RHIZOPHORA GYMNORHIZA. Rhcede.

Kayu-api-api, MALAY.

Handeb kakora of the Delta of the anges. *Rhizophora gymnorhiza* grows to a onsiderable size where the spring-tides rise ver it, as in the delta of the Ganges. The wood s yellow, hard, and durable; has a sulphurous mell, and burns with a vivid light; is chiefly sed by the natives for fire-wood and making osts for constructing their houses. The pith of he wood, boiled in palm wine or with fish, is used s food.—*Eng. Cyc.* Trunk generally dividing efore it reaches the ground like a parcel of hop oles piled up in form of a cone; the seeds hang own: from the apex proceeds the root: attains a onsiderable magnitude in places over which the pring tides rise. The wood is of a yellowish olour, hard and durable; its chief use is for urning and for posts with which to construct ie houses of the natives.—*Rohde M. S. S.* It used for fuel in the Archipilago.—*Crawfurd.*

(7096) RHIZOPHORA MANGLI. COMMON LACK MANGROVE, Rheed.

Pukandel, Tel. TAM.	Manggi,-Manggi, MALAY.
Oopoopoma, BENG.	Bhora, BENG.

Rhizophora Mangle, Bhora of the Delta the Ganges, the common or Black angrove, is found abundant on the shores of ic ocean, and within the delta of the Ganges, here it grows to a considerable size. The seed this species, which is from one to two feet ng, very quickly gives rise to a young tree, id, as mentioned by Browne in his 'History Jamaica,' if the apex from whence the root sues be stuck only a little way in the mud, the aves quickly unfold at the opposite end. The ood is dark-red, hard, and durable, and the bark is used for tanning leather.—*Eng. Cyc.* This tree forms a striking feature in the physical geography of the archipelago as it does indeed of all tropical countries, for a belt of it as deep as the reach of the tide is always found wherever there is a shallow and muddy shore. The tree which rises to the height of forty or fifty feet is invariably found in such situations constituting a dense, and almost impenetrable forest. Each tree stands in a cradle of its own roots from five to six feet high, bare at low water but at high water covered so as to give the appearance of trees growing in the sea. The mangrove jungle is the favorite resort of musquitos and crocodiles, and affords a convenient and almost inacessible retreat to the pirate.—*Crawfurd, p.*266. The Mangrove Bark of *Rhizophora mangle*, is used to dye chocolate color in the East and West Indies. This was one of the colors introduced by Dr. Bancroft, and for the exclusive use of which he obtained an Act of Parliament. It is procured in plenty at Arracan, Malabar and Singapore in the East (*Simmonds*). Also, in the Indian Archipelago, it is used in tanning: its wood gives a red dye.—*Crawfurd, page* 266. The great length of the seed of this species gives in a very short time a young tree, for if the apex from which the root issues is only stuck a little way into wet soil or mud the leaves quickly unfold at the opposite end. The wood is of a dark reddish colour, hard and durable. This species is valuable from its property of growing in salt marshes subject to the influence of the tide.—*Rohde, M.S.S.*

(7097) RHIZOPHORA MUCRONATA, is a species given by Dr. Wight.

(7098) RHODANTHE. COMPOSITÆ. This plant is a native of the Swan River, and is said to be as beautiful an annual as has been introduced into the English collections. It grows to a large size, and is covered with innumerable blossoms of rose and yellow colour; when grown from seed, the plants require to be continually shifted into larger pots, and the blossom buds at first pinched off; the shifting may be repeated five or six times until the plants have acquired a shrubby character, when the flowers will all expand, and continue in succession for some time.—*Riddell.*

(7099) RHODODENDRON, a genus of Plants belonging to the natural order *Ericaceæ.* The species are evergreen shrubs, very commonly cultivated in English gardens and shrubberies, and differing from *Azalea* principally in the stamens, being 10 instead of 5, in the corolla being campanulate, not tubular, and in the foliage being hard and evergreen. The species are nearly related to each other, and occur both in the New and Old Worlds. Thirty-two species of the genus *Rhododendron* have been distinguished by De Candolle in the seventh volume of his 'Prodromus,' in 1839; the maximum of known species at the present time exists in Asia; for, commencing with Borneo and other Malayan islands in the tropics of the southern hemisphere, and proceeding north, we find them recorded in the mountain regions of all intervening countries that have been botanically investigated, even to northern and extreme arctic Siberia. As we proceed westward into Europe they gradually disappear, one only inhabiting Sweden and Norway, *R. lapponicum*, and that seems not to extend to the western coasts. No species grows in Mexico or near the coasts of Oregon or California, and none in the isthmus of Panama. Throughout the whole of Africa and Australia the genus is unknown, and it will be observed that it only enters the southern hemisphere through the medium of the Indian Archipelago. Mr. Griffith in an excursion to one mountain in Bootan detected eight species, and Dr. Hooker, during a very limited sojourn in Sikkim, and notwithstanding great difficulties, was able to collect and describe a far larger number. These facts would lead to the conclusion that if the maximum of Rhododendrons be in Asia, their head quarters are on the lofty ranges of the Eastern Himalayas, where the mild and moist atmosphere is eminently suited to their habits. (Lindley, *Vegetable Kingdom*; Dr. Hooker, *Rhododendrons of the Sikkim Himalaya*) Within the last few years a number of species of these beautiful plants has been found in the Himalayan Mountains by Dr. Joseph Hooker, who has described them in his 'Monograph of the Rhododendrons of the Sikkim Himalaya.' The most beautiful of these forms are the R. Falconeri; Dalhousiæ; R. Barbatum R. Lancifolium; R. Wallichii, and R. Argentum.—*Eng. Cyc.* Dr. Wight gives in his Icones, Rhododendron arboreum, 1018-1201, formosum, 1202, grande, 1202, and Griffithianum, 1203. Numerous varieties are to be procured in Britain, those of *R. ponticum*, *R. maximum*, and *R. catawbiense* are the most robust; *R. hybridum* obtained between the Indian and American species is less hardy; *R. ferrugineum* and *R. hirsutum*, dwarf alpine species; *R. campanulatum*, a North Indian species.—*Eng. Cyc.*

Rhododendrons are very numerous at Laghep, near Tumloong, and Dr. Hooker gathered, in two days, seeds, of twenty-four kinds. These occurred in the following order in ascending, Commencing at 6000 feet—1. R. Dalhousiæ; 2. R. vaccinioides; 3. R. camelliæflorum; 4. R. arboreum. Above 8000 feet:—5. R. argenteum; 6. R. Falconeri; 7. R. barbatum; 8. R. Campbelliæ; 9. R. Edgeworthii; 10. R. niveum; 11. R. Thomsoni; 12. R. cinnabarinum; 13, R. glaucum. Above 10,500 feet:—14. R. lanatum; 15. R. virgatum; 16. R. campylocarpum; 17. R. ciliatum; 18. R. Hodgsoni; 19. R, campanulatum. Above 12,000 feet:—20. R. lepidotum; 21. R. fulgens; 22: R. Wightianum; 23. R. anthropogon; 24. R. setosum.—*Hooker Him. Jour. Vol*: II. *page* 197. No rhododendron grows at Churra, but several species occur a little further north—*Hooker H. J. Vol* II. *page* 282. On the hill above Choongtam village, in Sikkim, Dr. Hooker gathered, at 5000 to 6000 feet, *Rhododendron arboreum* and *Dalhousiæ*, which do not generally grow at Darjiling below 7,500 feet. Dr. Hooker collected here ten kinds of rhododendron, which, however, are not the social plants that they become at greater elevations. Still, in the delicacy and beauty of their flowers, four of them, perhaps, excel any other, they are *R. Aucklandii*, whose flowers are five inches and a half in diameter; *R. Maddeni*, *R. Dalhousiæ* and *R. Edgeworthii* all white-flowered bushes, of which the two first rise to the height of small trees.—*Hooker. Him. Jour. Vol.* II. *p.* 25. In the Tonglo mountains, in Sikkim in order of prevalence the trees were,—the scarlet *Rhododendron arboreum* and *barbatum*, the latter thirty to forty feet high as large bushy trees, both loaded with beautiful flowers and luxuriant foliage; *R. Falconeri*, in point of folinge the most superb of all the Himalayan species, with trunks thirty feet high, and branches bearing at their ends only, leaves eighteen inches long: these are deep green above, and covered beneath with a rich brown down. Next in abundance to these were shrubs of *Skimmia*, *Laureola*, *Symplocos*, and Hadrangea and there were still a few purple magnolias, very large *Pyri*, like mountain ash, and the Common English yew, eighteen feet in circumference the red bark of which is used in Nepal as a dye, and for staining the foreheads of Brahmins.—*Hooker. Him. Jour. Vol.* I. *p.* 167.

(7100) RHODODENDRON ANTHROPOGON AND R. SETOSUM, two dwarf species with strongly scented leaves occur at an elevation of 12,000 feet near Wallanchoon in East Nepaul.—*Hooker*, *Vol.* 1. *p.* 220

(7101) RHODODENDRON ARBOREUM, True Rhododendron, has lanceolate leaves, acute, silvery beneath, tapering to the base; peduncles and calyxes woolly; segments of corolla 2-lobed, with crenulating curled margins, capsule 10-celled, tomentose. It is a native of the warmer parts of India, and is one of the most beautiful of all trees, but too delicate to bear the open air in England. A steep ascent, in the Ryott valley in Sikkim, led through large trees of *Rhododendron arboreum*.—*Hook. Him. Jour. Vol.*II. *p.* 190.

(7102) RHODODENDRON ARBOREUM, *Variety roseum*, this, a variety of *R. arboreum*, grows to the height of thirty and forty feet in Sikkim.—*Hooker. Him. Jour. Vol.* I. *p.* 167.

(7103) RHODODENDRON ARGENTEUM. WHITE FLOWERED RHODODENDRON TREES, are found in Sikkim, at an elevation of 8671 feet.—*Hooker*. Rhododendron argenteum is a tree 30 feet high, having leaves very beautiful in the eaf-buds, erect and silky, at first enveloped in arge scales, so closely imbricated and so large as to resemble the cones of some species of pine, he outer or lower scales broad and coriaceous, glabrous, coloured (reddish-brown), the innermost ones oblong spathulate, pubescent. The flowers are 2 to 3 inches long, 2 to 2½ inches in diameter, always white.—*Eng. Cyc*

(7104) RHODODENRON AROMATICUM, Royle. Its leaves, "talesfur" are in India employ-d in medicine.—*Beng. Ph.* 222. The leaves of *Rhododendron aromaticum* (of Royle), are highly ragrant and stimulating; they are brought from Cabul, and called *Talesfur.* (*Royle's Illustrations*, . 259).—*O'Shaughnessy, page* 425.

(7105) RHODODENDRON BARBATUM, tree from 40 to 60 feet high, branched from he base. Flowers of a moderate size, of a deep uce or blood-colour, collected into a compact lobose head, from 4 to 5 inches in diameter. t is one of the most beautiful of the Himalayan pecies, and is readily distinguished by its havng bristly petioles and numerous branches floriferous at their apices.—*Eng. Cyc.*

(7106) RHODODENDRON CAMPANU-ATUM is said to be Rhododendron anthropoon, Don. or Rhododendron aromaticum, Wall, vegetates on the Cashmere mountains; its aves are officinal in Cashmere and Lahore, here they are administered as errhine, to proace sneezing.—*Thirty-five years in the East by onig. p* 335. The leaves are imported from hibet and Cashmere, under the names *Bury-ibbut* and *Hoolas Cushmeree*, and are used by e natives as a snuff.—*O'Shaughnessy, p.* 425.

(7107) RHODODENDRON CINNABARNUM. The leaves of ("Kema Keehoong," epcha: Kema signifying Rhododendron) this ecies alone is said to be poisonous; and when ed as fuel, it causes the face to swell and the es to inflame; of which Dr. Hooker observed veral instances.—*Hooker.*

(7108) RHODODENDRON CHRYSANHUM has acute leaves attenuated at the base, long, glabrous, reticulately veined, and of a sty colour beneath; flowers and buds clothed th rusty tomentum; pedicels hairy; calyx rdly any; segments of the corolla rounded; arium tomentose. It is a native of Siberia on e highest mountains, and of the Caucasus. e plant and its effects were first described by melin and Steller, who mention it as used in beria for the cure of rheumatism; with us it is ed in decoction as a substitute for colchicum. -*Eng. Cyc.*

(7109) RHODODENDRON DALHOUSIÆ parasitical on the trunks of large trees, especally oaks and magnolias. It has large flowers, ree to seven, in a terminal umbellate head, the read of which is greater than that of the aves. The calyx large, deeply-divided almost the base into five ovate elliptical very obtuse spreading foliaceous lobes; corolla very large, 3½ inches to 4½ inches long, and as broad at the mouth, campanulate, white, with an occasional tint of rose; in size and colour and general shape almost resembling that of the white Bourbon Lily, very frequently having the odour of the Lemon.—*Eng. Cyc.*

(7110) RHODODENDRON FALCONERI, a white flowered species, never occurring below 10,000 feet above the level of the sea, is one of the most striking and distinct of the genus.—*Eng. Cyc.* It occurs in East Nepal, where it grows to a height of forty feet with leaves nineteen inches long.—*Hooker. Vol.* I, *p.* 272. This species, in point of foliage, is the most superb of all the Himmalayan species, with trunks thirty feet high, and branches bearing at their ends only, leaves 18 inches long. These are deep green above and covered beneath with a rich brown down.—*Hooker.*

(7111) RHODODENRON HODGSONI. Its foliage is of a beautiful bright green, with leaves sixteen inches long: Its bark is as delicate as tissue paper and of a pale flesh colour.—*Hooker. Vol.* I. *p.* 250.

(7112) RHODODENDRON LANCIFOLIUM is a shrub 6 or 8 feet high; the bark reddish, papery, easily separating and falling off. Branches spreading, tortuous, wrinkled, and knotted; flowers of a moderate size, collected into a rather dense head at the ends of the branches; corolla of a rich purple colour.—*Eng. Cyc.*

(7113) RHODODENDRON NIVALE This, the most alpine rhododendron, spreads its small rigid branches close to the ground.—*Hooker. Him. Jour. Vol.* II. *page* 135.

(7114) RHODODENDRON PONTICUM is the species to which most of the varieties of English gardens belong. The leaves are oblong-lanceolate, glabrous on both surfaces, attenuated towards the thick petioles, with a streak on the upper surface and of a wide lanceolate form, racemes short and corymbose. It is a native of Asia Minor in Pontus, and of Gibraltar, Spain, and the Caucasus, in wet places, in beech and alder coppices. The corolla is large, purplish, with ovate, acute, or lanceolate segments. The calyx minute, 5-toothed, somewhat cartilaginous. At one time it was supposed that it was this plant which rendered the honey of Asia Minor poisonous, but it has been ascertained that the effect is really produced by *Azalea Pontica.*—*Eng Cyc.*

(7115) RHODODENDRON PUNICEUM.
Kaephul HIND.

A common tree on the lower ranges of the Himalaya hill, the bark called Kaephul is brought to Ajmere, from Delhie and Mirzapoor, and is used as a rubefacient and sternutatory. Dr Irvine found Kaephul and pounded ginger, mixed, the best substance with which to rub cholera patients to promote reaction: one maund costs five Rupees. The fresh flowers are pleasantly acid, and are eaten by the hill men to quench their thirst during the ascent of the hills, the flowers are also made into a jelly.—*Gen. Med. Top. p.* 140.

(7116) RHODODENDRON WALLICHII is a very distinct and handsome species, with lilac-coloured flowers. Its leaves are quite unlike any Indian species, and the flowers in colour and size resemble those of the much cultivated *R. Ponticum.—Eng Cyc.*

(7117) RHODYMENIA, is an ill-defined genus of Algæ, of the order Rhodymeniaceæ, and will probably be divided into several distinct genera: many of the species, especially of the section *Calophyllis* are among the most splendidly coloured of crimson and carmine *Algæ.* Others, as *R. Hombroniana*, are clothed in royal purple; while others, like the sober dulse, of British coasts, *R. Palmata*, have often as much of brown as of purple in their attire.

(7118) RHODYMENIACEÆ, an order of *Algæ*, consisting of purplish or blood-red Sea-Weeds, with an expanded or filiform inarticulate frond, composed of polygonal cells, occasionally traversed by a fibrous axis.—*Eng. Cyc.*

Many of the *Rhodymeniaceæ* are valuable in an economic sense.—*R. palmata*, the Dulse of English coasts, is collected largely in Scotland and Ireland, and forms an important article of diet. Many of the *Gracilariæ* are largely used in the East as ingredients in soups and jellies, and also as substitutes for glue.

(7119) *Gracilaria spinosa.* One of this order, *G. spinosa*, is the Agar Agar of the Chinese, and is largely collected both for culinary purposes, and as a component part of one of the strongest Chinese glues. It has recently been imported into England, and is occasionally used instead of carrageen moss in making jellies and blancmanges.—*Eng. Cyc.*

(7120) RHUBARB. RHEUM.

Rawund, ARAB.	Reobarbaro, IT.
Ta-havinwg, CHIN.	Rheum, LAT.
Tahoan, COCH-CHIN.	Rawund, PERS.
Rhubarber, DUT.	Ruibarbo, PORT.
Rhubarbe, FR.	Rewen, RUS.
Rhabarber, GER.	Ruibarbo, SP.
Rawunchenee, GUZ. HIND.	Variattoo kalang, TAM.

Rheum, Radix, Root, of an undetermined species of Rheum, *Linn.*. of R. palmatum, L. D. and of R. undulatum. The name Rheum is derived from the ῥεον of Dioscorides; but his description does not well apply to modern Rhubarb. This was, however, known to Paulus Ægineta, &c. The Arabs were acquainted with several kinds, as Indian, Khorassanee, Chinese (their *rewund sini*). The Persians give *reon* as the Greek synonyme of their *rawund*, which is Rhubarb, and of which the plant they say is called *ribas.* Rhubarb is no doubt the rootstock of a species of Rheum, but the species is still unknown. Dr. Royle, after giving (Him. Bot. p. 314—318) an account of the commerce of Rhubarb, stated that "This would bring the Rhubarb country within 95° of E. long. and 35° of N. latitude, that is, into the heart of Tibet. As, no naturalist has visited this part, and neither seeds nor plants have been obtained thence, it is as yet unknown what species yields the Rhubarb." This seems now the general opinion. Sievers, an apothecary sent in 1790 by the Russians to investigate the subject, had previously said, that "his travels had satisfied him that as yet nobody, that is, no scientific person, has yet seen the true Rhubarb plant." Dr. Fischer when in London, subsequent to the above publication, informed the author that all the information obtained of late years in Russia, only confirme what was previously known, that *Rheum palmatum* is not the species, but that the genuine plan is a small one with roundish denticulate leaves So, more recently, Calau, apothecary in the Rhubarb factory at Kiachta, says: "All that we ye know of the Rhubarb plant or its orgin is defective and wrong; every sacrifice to obtain true plant, or the seed, has been in vain; no has the author been enabled to obtain it." Dr Falconer entered Tibet from the side of Cashmere and proceeded as far as the Muztah range, o about long. 77° E. and lat. 36°, a region wher Rhubarb is sent as a present to the Chief Ahme Shah from the true Rhubarb country, but wa unable to learn anything respecting commercia Rhubarb. He discovered new species of Rheum and obtained specimens of genuine Extract o Rhubarb *ossareh-rewund*, or Rhubarb-juice, name which he as well as Dr. Royle found applied in north-west India to Gamboge. He als found Rhubarb-root employed there as a yello dye. Some information might probably be procured respecting Rhubarb from the traders t Upper Assam.

(7121) *Rheum; Linn. Enneandria Monog. Lin* Flowers complete; perianth petaloid, 6-parte with equal segments. Stamens usually 9, inserted in pairs into the base of the 3 outer segments, and singly into the 3 interior; filament subulate; anthers versatile. Ovary triangular 1-celled. Ovule single, basilary, orthotropou Styles 3, short, reflexed. Stigmas 3 entire, subdiscoid, spreading. Achænium 3 cornered, broadly winged, supported by the withered periant at the base. Seed erect, triangular. Embry straight, antitropous, in the axis of farinaceou albumen. Cotyledons flat, radicle short, superio

Herbaceous plants, with perennial and branching rootstocks, which are thick and succulen Stem of most 4 to 10 feet high, except in N 1 and 2. Leaves large, more or less cordate, wav at the margin, sheathing at the base, either a radical, or where cauline, alternate. Inflorescenc paniculate, or spicato-racemose. The specie are valuable not only on account of their roo stocks or Rhubarb, but also from the agreeable cidity of their leaf-stalks, employed for making herbets, tarts, &c. They inhabit cold parts of the world, as the southern part of Russia, Siberia, Tibet, the north of China and the Himalayan nountains, also Affghanistan and Persia. Hence ll may be grown in the open air in Europe, and several are so cultivated. As no species seems nore entitled than another to be considered as ielding either the Russian or Chinese Rhubarb f commerce, we shall briefly enumerate all, vithout describing any.

With Spike-like Racemes.

(7122) *a. Rheum Spicciforme, Royle.* (Illustr. Iimal. Bot. p. 318. t. 78.) Kherang Pass and ther places in Kunawar. Found by Dr. Falconer in Tibet.

(7123) *b. R. Moorcroftianum, Royle,* (*l, c.* p. 18. Lindl. Med. Bot. p. 356.) Niti Pass in the Iimalayas. Found by Dr. Falconer in Tibet. 'hese two species differ in their inflorescence rom the other described species. Their roots re more dense in texture and of a more yellow olour than those of *R. Emodi* and *R. Webbianum* he powder of both is of a light and bright yelw colour. Dr. Falconer met with both in ibet, and discovered another species of this oup. It is probable that the commercial species ill be found to resemble these in habit, from eing indigenous, like them in the elevated, arid, d cold regions of Tartary.

With Compound Racemes.

(7124) *c. R. emodi, Wall.* Bot. Mag. t. 3508 . *Australe,* Don. Sweet Fl. Gard. t. 269. Nees n E. Suppl. t. 31. A. and B. Lindl. Fl. Med. 354.

(7125) *d. R. Webbianum, Royle, l. c.* p. 318. 78, a. Choor Mountain. Niti Pass. This elded the Rhubarb submitted to experiment by r. Twining. Trans. Med. Soc. Calc. iii. p. 439.

(7126) *e. R. Ribes, Linn.* Dill. Elth. t. 158. f. 2. An. Mus. 2. t. 49. *Ribas* and *rivash* of e Affghans and Persians, much celebrated ong them, and much esteemed on account of e agreeable acid of its leafstalks. The root is d to be *rawund.* It is the *Riwas* of Serapion, o mentions it as making a good sherbet. It said also to be found on the mountains of ria.

(7127) *f. R. Rhaponticum Linn.* Alpin Rhant, i. t, 1. Nees von E. 113-14-15. Borders the Euxine, and on the north of the Caspian a. Deserts near the Volga. and in Siberia, as it known to yield Siberian Rhubarb. Supposed have yielded the Rhabbarum of the ancients. ltivated in Great Britain on account of its lks, and extensively at Banbury on account of roots, and also at Rheumpole near Lorient, in department of Morbihan in France.

(7128) *g. R. crassinervium Fischer.* Sent from . Petersburgh to the Apothecaries' Garden at Chelsea. Roots large, and said to have the colour and odour of Turkey Rhubarb.

(7129) *h. R. leucorrhizum Pallas* R. nanum, *Sievers.* Ledebour, Il. Pl. Ross. t. 492. Found in the deserts of the Kirghis, and South of Siberia, and Altai Mountains. Said to yield *White* or *Imperial Rhubarb.*

(7130) *i. R. Undulatum, Linn.* Amœn. Acad. iii. t. 4. Nees von E. 116, 117. St. and Ch. 177. Lindl. Fl. Med. p. 357. A native of Siberia, Tartary, and China? Seeds of what was called the genuine Rhubarb plant were given to Kauw Boerhaave by a Tartarain merchant, and these seeds produced this species and *R. palmatum,* both of which are admitted as officinal in the D. P. This is said to be cultivated in France as one of those yielding French Rhubarb.

(7131) *j. R. Caspicum, Fisch.* Caspian Shores and Altai Mountains. Lindl. p. 557.

(7132) *k. R. Compactum, Linn.* Mill. Dict. 218. Nees von E. 121. A native of Chinese Tartary, said to yield some of the Rhubarb cultivated in France, which forms a fair imitation. Valued in Britain on account of its stalks.

(7133) *l. R. Palmatum Linn* L.D. This species easily distinguished from the others by its roundish, cordate, half palmate leaves, with the lobes also deeply cut. Root large, branched, brown externally, of deep yellow internally. Supposed to be a native of the mountains of Mongolia near the great wall of China. The seeds of this were received by K. Boerhaave with those of *R undulatum* as those of the genuine Rhubarb; and it is thought, when cultivated in Europe, to resemble Chinese-Russian Rhubarb more closely than any other kind. in taste, odour, internal structure, and the action of some chemical reagents.

(7134) *m. R. Hybridum. Murray,* is a doubtful species, but is remarkable for the great size of its roots as cultivated both on the Continent and in this country. This plant with R. Rhaponticum, compactum, and emodi, with hybrids from them, are those most commoly cultivated in great Britain on account of their stalks.

The greater part of the Rhubarb of commerce grows in Chinese Tartary, on the mountains and plains surrounding Lake Kokonor (*Pallas and Kehman*), especially in the province of Gansun (or *Kansu? Calaw*) and is gathered in summer from plants of six years of age. When dug up, it is cleansed, peeled, cut into pieces bored through the centre, strung on a string, and dried in the sun. In the autumn it is brought to Sinin, where Bucharian traders reside, and from thence sent to the Russian frontier town of Kiachta, and to Pekin, Canton, Macao. Considerable care is bestowed at the Russian factory in examining and separating the good from the inferior pieces, also from impurities; and in paring the Rhubarb to remove remaining portions of the bark, also the upper part of the root, and in perforating all pieces so as to examine their interior; because many, though sound externally, soon decay internally, from the rapid drying it is thought. Dr. Royle, however, found most old roots of R. Webbianum more or less decayed. It is collected in quantities of 40,000 pounds before it is imported into the European parts of Russia, and is packed in bags, and placed where there is a free current of air, afterwards in chests.'

(7135) *Russian*, called also *Turkey Rhubarb*, but which in Russia is called *Chinese Rhubarb*, is imported into the frontier town of Kiachta, and thence sent to Moscow and St. Petersburgh; whence it is distributed to the rest of Europe. It varies in shape, being irregularly roundish, and angular, from the bark having been shaved off with a knife; some pieces are cylindrical, a few flattish, many of them pierced with holes. Externally smooth, of yellow colour; internally, the texture is rather dense; fracture uneven, irregularly marbled with white and red veins, having a strong and peculiar slightly aromatic odour, a bitter, rather astringent taste, feels gritty when chewed, tinges the saliva yellow, and produces a powder of a bright yellow colour. Mr. Queckett obtained from 35 to 40 per cent. of raphides, or conglomerated crystals of oxalate of lime, which are situated within the cells, and which are the cause of the grittiness experienced when Rhubarb is chewed.

(7136) *Bucharian Rhubarb*, which makes its way to Vienna by Brody and Nischny, seems, from specimens and information afforded by Mr. Faber to Dr. Pereira, to be the inferior kinds of the above Rhubarb, and which, as inferred by the latter, would be burnt, if presented to the Russian authorities; it therefore finds its way into Europe by other channels. It is intermediate between the Russian and the Chinese Rhubarb, and generally of inferior quality.

(7137) *Chinese*, sometimes called *East India Rhubarb*, consists of two or three varieties: 1. One called by Dr. Pereira *Dutch-trimmed*, or *Batavian Rhubarb*, and, according to the shape, called *Flats* or *Rounds* in the trade, is closely allied to, and is derived, with very little doubt, from the same sources as the Russian Rhubarb; some of which, as mentioned above, finds its way to Canton, and is thence imported into Europe, or first into one of the Indian ports, and thence re-exported to Europe. It resembles the above in appearance, as the cortical portion appears to have been sliced off, and not scraped. The holes with which the pieces are perforated often contain within them pieces of the string by which they had been strung together. 2. Another variety which is more particularly called *Chinese Rhubarb*, also, *half trimmed*, is distinguished from that called Russian, as being irregular in shape, never angular, but the edges rounded, as if the bark, instead of being sliced, had been scraped off, often some of it still remains adherent; the roots are, besides, of less uniform good quality than the Russian. Externally or a dull er yellow; many of the pieces heavier from being more compact, the reticulation less regular, and of a yellowish-brown colour. 3. A third variety has lately been described by Dr. P. under the name of *Canton Stick Rhubarb*. This is in *cylindrical* pieces about two inches long, and from ½ to three quarters of an inch in diameter. These are probably produced in the mountains which bound China, as those of the province of Sechuen, and perhaps of Kansu.

(7138) *Siberian Rhubarb*. Small quantities of this kind have been imported by Mr. Faber, and have been proved to be those called by Grassman and others *Siberian Rhapontic Root*. This occurs in long, thin, almost cylindrical or spindle-shaped pieces, decorticated and perforated by a hole. Colour, externally pale yellow, internally brownish yellow, or reddish white. Odour and taste of good Rhubarb, but weaker; does not feel gritty. Dr. Pereira compares it with English *Stick Rhubarb* (v. P. J. iv. 448 and 500). It has since been proved (P. J. vi. p. 74) that the Rhuburb cultivated at Banbury is yielded by the same species, that is *Rheum Rhaponticum*.

(7139) *Himalayan Rhubarb*. This is produced by different species, is of very different quality. That yielded, probably by *R. Moorcroftianum*, given to Dr. Royle by Major Hearsey, the companion of Mr. Moorcroft, was of a bright but light yellow colour, and, as stated by Dr. Royle in 1827, "appeared both in sensible qualities and medical virtues to equal the best Rhubarb that he had ever seen". (*Trans. Med. Soc of Calcutta*, iii. p. 439.) The Rhubarb of *R. Webbianum* was tried by Dr. Royle in both the Military and the Civil Hospital at Saharunpore, and found to be of very good quality. Some of it was subsequently submitted by the Medical Board to the late Mr. Twining, for experiment in the General Hospital at Calcutta. After trial in 43 cases, he reported that in doses of ℈j. or dr.½ it has a good purgative effec operating nearly as freely as the best Turke Rhubarb; and, further, that the effects of sma doses of the remedy, as a tonic and astringen are highly satisfactory; also, that it "is ve efficacious in moderate doses for such cases as Rhubarb is generally used to purge." After a further trial in 4 other cases of Diarrhœa, he reports, "If further experiments should confirm the efficacy of the Himalaya Rhubarb in such cases, the acquisition of this remedy to the Materia Medica of this country will be of the utmost importance" (l. c. p. 445). This Rhubarb differs much in appearance from that of commerce. The bark, of a brownish colour, has not been taken off. The texture is radiated, rather spongy, the colour a yellowish brown, the powder of a dull brownish-yellow colour, with little aroma (but when fresh dried, the the root was described as aromatic by Mr. Twining) with a bitter and rather astringent taste. Dr. Royle selected the branches of the roots, for he found the root-stock generally decayed in the centre. They were cut into short pieces, and slung upon a string for the facility of drying. Some of the Himalayan Rhubarb is probably yielded by R. Emodi, perhaps by other undiscovered species of Nepal, and of the passes towards Bootan. Their value must be decided by their medical effects in the cases for which they are suited, and not by their differing in appearance from the roots of other species.

(7140) *English Rhubarb.* This is cultivated at Banbury, in Oxfordshire, to the extent of twenty tons annually, and is the produce of *Rheum Rhaponticum* (*v.* P. J. vi p. 75). It is the kind frequently sold by men dressed up as Turks as Turkey Rhubarb. The species vary in shape, some being ovoid, others cylindrical (*English Stick Rhubarb*), smoothed externally, and rubbed with a yellow powder; light rather spongy, with a reddish hue. It is rather mucilaginous in taste and a little astringent. Its odour feeble, but unpleasant. It is supposed that much of this is employed for adulterating the Asiatic Rhubarb when in a powdered state (v. P. J. vi. p. 74 and 76.) A variety of analyses of Rhubarb have been made by different chemists, but with such varying results, that Dr. Schlosperger and Dæpping say that " not one satisfactory analysis is to be met with."—*Royle.*

The extent of country from which rhubarb of one kind or another is actually collected, according to Christison, stretches from Ludall, in 77½ East longitude. to the Chinese province of Shensi, 29 degrees further East, and from the Suechan mountains, in north latitude 26 degrees, nearly to the frontiers of Siberia, 24 degrees northward. The best rhubarb is said to come from the very heart of Thibet, within 95 degrees east longitude and 35 degrees north latitude, 500 or 600 miles north of Assam. The price of Chinese rhubarb is inferior to that of Russia or Turkey. It varies in China from 38 dollars per picul upwards, and about 1,500 piculs are annually exported, on an average at 500 dollars per picul. In 1844, 2,077 piculs were shipped from Canton for Great Britain; and of 95,701 lbs. imported in 1841, 43,640 lbs. were brought from China, 8,249 lbs. from the Philippines, 7,294 lbs. from the East Indies, and 33,710 lbs. from the United States; only 1,462 lbs. were brought from Russia. The imports from the East Indies, have decreased more than 70 per cent. in the last twelve years, as compared with the preceding. The wholesale prices are, for round rhubarb, 8d. to 3s. per lb.; flat, 6d. to 3s. 3d. per lb.; Dutch trimmed, 6s. to 7s. per lb.; Russian, 13s. to 13s. 6d. per lb. In 1831, England imported 133,462 lbs. from the East India Company's possessions, and 6,901 lbs. Russia. In 1845, only 71,298 lbs. came from the East. From China we received, in 1843, 172,882 lbs.

The quantities of rhubarb on which duty of 1s. per lb. was paid in the six years ending 1840, were as follow:—

	East Indian. lbs.	Foreign. lbs.
1835	32,515	10,647
1836	36,836	7,752
1837	44,669	5,946
1838	37,026	7,402
1839	22,575	12,525
1840	16,745	22,203

The English imports and consumption of rhubarb are thus stated in the *Pharmaceutical Journal* :—

	Imports. lbs.	Consumption. lbs.
1826	102,624	32,936
1831	140,395	40,124
1836	122,142	44,468
1841	95,701	67,877
1846	427,694	0
1847	305,736	0
1848	116,105	0
1849	94,914	0

The rhubarb brought into Siberia grows wild in Chinese Tartary, especially in the province Gansun, on hills, heaths, and meadows, and is generally gathered in summer from plants of six years of age. When the root is dug up, it is washed to free it from earthy particles; peeled, bored through the centre, strung on a thread, and dried in the sun. In autumn all the dried rhubarb collected in the province is brought in horsehair sacks containing about 200 lbs., to Sinin (the residence of the dealers), loaded on camels, and sent over Mongalia to Kiachta, and the ports and capital of China.—*Simmonds.*

(7141) RHUS, the name of a genus of Plants belonging to the natural order *Anacardiaceæ*, and to the tribe *Sumachineæ*. One of the species, *R. cotinus*, appears to have been known to Pliny, who refers to its dyeing properties, and its place of growth, the Apennines, under the name of Cotinus. This genus has an extensive geographical range, from the south of Europe to the Cape of Good Hope. It is also found in Asia and North and South America. Most of the species are poisonous, but they are much cultivated as ornamental shrubs, especially on account of the beautiful red colour of their leaves in autumn. Many of them are used also for the purposes of dyeing and tanning; as an astringent principle, to which is frequently added an acid, is common to the whole genus. The genus *Rhus* has the following characters:—Flowers bisexual, or polygamous; calyx small; persistent, 5-partite; petals 5, inserted under the margin of the disc, imbricate in æstivation; stamens 5, hypogynous; ovary 1-celled, sessile; fruit, a dry drupe; seed solitary, exalbuminous; radicle opposite the hilum, and bent downwards along the edge of the cotyledons. Leaves alternate, simple, or compound; panicles axillary or terminal. De Candolle enumerates about 90 species, to which other writers have made additions, but there is reason to believe that many of the new species are merely varieties. We shall here enumerate only a few of those which are of interest on account of being cultivated, or their uses in medicine and the arts. Dr. Wight gives *Rhus Bucki-Amela*, 561; *Roxburghii*, 561, *semialata*, var. β *Roxburghii*, 561; succedanea. 560.

(7142) RHUS COPALLINA, Gum-Copal or Mastich-Leaved Rhus. Leaf glabrous above, slightly pilose beneath, 5-7 pairs of leaflets and an odd one, lanceolate and entire; petiole winged and jointed; root creeping; flowers yellowish-green; diœceous. It is a native of North America from New Jersey to Carolina.

(7143) RHUS CORIARIA, Hide, or Elm-Leaved Sumach.

Shumuk Pers. | Tumtum, Arab.

A native of Persia, Syria, Palestine, and the south of Europe, about 8 or 10 feet high, divided into numerous irregular branches. All parts of this plant are inodorous, but have a styptic taste; to the abundance of tannic acid it owes its properties and value in the arts; M. Tromsdorf has found in the berries a large quantity of bi-malate of lime.—*O'Shaughnessy, page* 282. Leaf 5-7 pairs of villous leaflets, elliptical, bluntly and coarsely toothed, petioles naked. Flowers in large loose panicles of a whitish-green. Drupes villous. This plant is a native of the south of Europe. It is extensively used for the purpose of tanning, and it is said that all the leather made in Turkey is tanned with the bark of this species of *Rhus.* The fruit is acid and astringent, and the seeds are often used as tonics for exciting the appetite.—*Eng. Cyc.*

(7144) RHUS COTINUS. Venus-Sumach, or Wild Olive. Flowers bermaphrodite, arranged in loose panicles of a greenish-yellow colour; leaves simple, entire. This is a very ornamental shrub, and is one of the European species, growing wild in various districts of the south of Europe. It is made use of, like many other of the species, for tanning, in Italy, and is called Scotino. The wood is used by the modern Greeks for dyeing wool, which is said to be of a beautiful rich yellow. It is frequently cultivated on account of its beauty.

(7145) RHUS DECEPIENS. *Wight* Terebinthaceæ, III. 75.

Kat poovarasco marum, Tam.

A very fine close grained light coloured wood: judging from a branch specimen it must, if procurable of good size, be one of considerable value.—*Wight.*

(7146) RHUS GLABRA. Smooth-Leaved Sumach. Leaf like the last, but broader and glabrous. Branches also glabrous. Fruit red, covered with silky hairs. This species, as well as another named *R. viridifolia* is considered by some botanists as only a variety of *R. typhina.* Like the last, this species is abundant in North America, over-running sometimes a whole district, and forming a troublesome weed. Its fruit is very sour, but may be eaten with impunity. Bees are very fond of the blossoms.

(7147) RHUS LUCIDA. Terebinthaceæ. Shining leaved Sumach, introduced from the Cape.—*Riddell*

(7148) RHUS RADICANS, Rooting Poison-Oak, or Sumach.—Leaf one pair of leaflets and an odd one, odd one petiolated, glabrous, entire. A native of America from Canada to Georgia. Its climbing habit, combined with the beautiful red colour of the leaf during decline of the year renders it one of the most picturesque of American plants. It frequently abounds in the forests, where it may be seen covering the tops of the highest trees. It climbs up walls and rocks, and runs upon the ground with equal facility, thus covering everything within the reach of its stems. De Candolle distinguishes three varieties: *R. vulgaris*, with a stem climbing by means of roots; *R. volubilis*, climbing without roots; and *R. microcarpa*, with fruit much smaller than the other two. 'Like R. Toxicodendron it emits a juice which indellibly stains linen. It is equally poisonous with *R. venenata.* A detailed account of the effects of the genus *Rhus* may be seen in Professor Kalm's 'Travels in North America.

(7149) RHUS TOXICODENDRON, common Poison-Tree, or Poison-Oak.—Leaf of one pair of leaflets and an odd one, with a petiole, inciso-angulate, pubescent; flowers greenish. It is found in woods, fields, and fences, in common with R. Radicanns in North America, where they are both known by the same name. Many botanists consider the two only varieties of the same plant. This species is the type of the genus *Toxicodendron* of Tournefort. It was introduced into England in 1640, and first grown in the Bishop of London's garden at Fulham. This species is that which is most frequently used in medicine. The less common species of this genus cultivated in Britain are—*R. pumila* (Dwarf Sumach), *R. viridiflora* (Green-Flowered Sumach), *R. pentaphylla* (Five leaved sumach), *R. suaveolens* (Sweet-Scented Sumach), and *R. aromatica* (Aromatic Sumach).

(7150) RHUS TYPHINA, Fever-Rhus, or Stag's-Horn Sumach. Leaves with 8 16 pair of leaflets and an odd one, lanceolate-acuminate, serrated, pilose beneath. There are two forms of this plant; the one *R. t. arborescens,* in the form of a tree, from 10 to 25 feet in height; the other *R. t. frutescens*, shrubby, and only from 2 to 10 feet high. The young shoots are covered with down, which, with their somewhat crooked and stunted branches, give them the appearance of young stags'-horns; hence their name. The flowers are in dense spikes, at the ends of the branches, the pistilliferous ones developing themselves into woolly drupes, which are very conspicuous when ripe. It is found in every part of North America, and its dark-red leaves add much to the beauties of an American autumn. The fruit of this plant is exceedingly sour, and on this account it is frequently called vinegar plant, and is even used in some parts as a substitute for vinegar.

(7151) RHUS VENENATA, Poison Sumach, or Swamp Sumach. Leaf 6-7 pair of leaflets, almost glabrous, entire, lanceolate-acuminate, reticulated beneath. Fruit white. It is a native of North America from Canada to Carolina, and also in swampy districts in Japan. This plant is exceedingly poisonous, so virulent that it is said to affect some persons by merely smelling it. A touch will sometimes produce violent inflammation. It is a beautiful shrub, and well worthy of cultivation, but great care should be taken to prevent its being carelessly handled.

(7152) RHUS VERNICIFERA, Varnish-Bearing Sumach, or Japan Varnish-Tree. Leaf with 5-6 pairs of leaflets, all ovate, long, acuminate, entire, glabrous above, velvety beneath. It is a native of Japan and Nepaul. Its leaves are very large and beautiful, rendering it one of the handsomest of shrubs. According to Thunberg, this is the plant which yields the celebrated Japan Varnish.

(7153) RHUS VERNIX, OR VERNICIA. Chinese Varnish Tree. When Mr. Fortune prepared to take up his late residence in China, his attention was directed by the Calcutta Agricultural Society, to the Chinese varnish tree, *Rhus* species, the wax-insect tree, *Fraxinus* species, and to the soap-bean tree, *Cæsalpinia* species: to the various trees valuable for their fruit or timber and ornamental plants; but above all to the green indigo (so called), *Rhamnus* species, which yielded a dye that was at that time attracting much attention in France. He says, the tree which yields the Chinese varnish is a species of Rhus which although producing an article of great value is extremely dangerous to use. The varnish is largely used in the country for giving a fine polish to tables and chairs used in the houses of the wealthy. The beautiful lacquer ware so extensively exported from Canton to foreign countries and which is so well known and justly admired, is produced by this tree. It has the valuable property of being less liable than French polish to be injured by a heated vessel which may be placed upon it, but it is very poisonous and requires to be handled with great care by the workmen who use it. Indeed after furniture is dry it is very unsafe for certain constitutions until it has been in use for some time and the smell entirely gone. A friend of mine Mr Jones, American consul at Foo-chow-foo, used some furniture which had been lacquered some time and was apparently quite dry and yet he was very ill for a long time from its effects, so ill that he thought he should be obliged to leave the country and go home. And this is no solitary instance, for I have known several persons suffer most severely from the same cause.—*Fortune's Residence, p.* 146. Williams says, the beautiful appearance of the lacquered-ware of China owes its lustrous coloring to a composition of lampblack and the clarified juice obtained from a species of sumach, called *Rhus Vernix* or *Vernicia*. Wood oils are obtained from other plants of the same family, and the different qualities of lacquered-ware are owing to the use of these inferior ingredients. The real varnish tree is described by De Guignes as resembling the ash in its foliage and bark, it is about fifteen feet in height, and furnishes the sap when seven years old, which is carefully collected from incisions in the trunk opened in the summer nights. The body of the ware is wood partially smoothed, or pasteboard, upon which two or three coats of a composition of lime, paper, and gum are first laid and thoroughly dried and rubbed. The surface of the wood is also hardened by rubbing coarse clay upon it, and afterwards scraping it off when dry. Two coatings of lamp black and wood oil, or in the finer articles, of lamp black and varnish, are laid upon the prepared wood, and after drying, the clear varnish is brushed on, one coating after another, with the utmost care, in close and darkened rooms, allowing it to dry well between the several coats. The articles are then laid by to be painted and gilded according to the fancy of customers, after which a last coating is given them. The varnish is brought to market in brownish cakes, and reduced to its proper fluidity by boiling; it is applied to many purposes of both a varnish and paint, when it is commonly mixed with a red or brown color. A beautiful fabric of lacquered-ware is made by inlaying the nacre of fresh and saltwater shells in a rough mosaic of flowers, animals &c. into the composition and then varnishing it. Another kind, highly prized by the Chinese, is made by covering the wood with a coating of red varnish three or four lines in thickness, and then carving figures upon it in relief. The great labor necessary to produce this ware renders it expensive. A common substitute for the true varnish is the oils of the Dryandra, Jatropha, Croton, and other members of the Euphorbiaceous family, expressed from their seeds by a variety of simple machines, consisting for the most part of different applications of power to cylinders and pestles by which the seeds are pressed or pounded. The oil, after pressing, according to De Guignes, is boiled with Spanish white in the proportion of one ounce to half a pound of oil; as it begins to thicken, it is taken off and poured into close vessels. It dissolves in turpentine, and is used as a varnish, either clear or mixed with different colors; it defends woodwork from injury for a long time, and forms a good painter's oil. Boiled with iron rust, it forms a reddish brown varnish. In order to prevent its penetrating into the wood when used clear, and to increase the lustre, a priming of lime and hog's blood simmered together into a paste is previously laid on.—*Williams' Middle Kingdom, Vol.* I. *p.* 121.

(7154) RHUS : *Species.*

Coongilliya marum, Tam. | Bucki amela,

Dr. Wight says, this is the chloroxylon dupada of Buchanan and Ainslie. An undescribed name and judging from the leaves, one not required, which are clearly those of a rhus very nearly allied to Roxburgh's R. Buckiamela, but distinct. The qualities of the timber is unknown. The outer sap-wood is white, fine grained and heavy, apparently very good.—*Wight.*

(7155) RHYNCHOPS ABLACUS, a Shearwater occurs at Siligoree in the Terai.—*Hooker. Him. Jour. Vol.* I *p.* 399.

(7156) RHYSICOSIA VESTITA, a beautiful purple-flowered leguminous plant with small tuberous roots, is cultivated to some extent in the Khasia Hills.—*Hooker, Him. Jour. Vol.* II. *p.* 287.

(7157) RHYZOMYS CHINENSIS. The Chinese bamboo rat or chuck shu is found in the western part of Kwangtung.—*Williams' Middle Kingdom, p.* 257.

(7158) RIBBON.

Ruban de Soie, Fr.
Band, Ger.
Pheet, Guz. Hind.
Nastro di seta, It.
Cinta de Seda, Sp.

A name given to silken bands of various widths and colours, much used for trimming bonnets, caps, and other purposes. They are both plain and flowered, and are distinguished into sarcenet, satin, &c, according to the manner in which they are made.—*Faulkner.*

(7159) RICE.

Aruz, Arab.
Lua, Cochin-china.
Riis, Dan.
Ryst, Dut.
Riz, Fr.
Reiss, Ger.
Chooka, Guz-
Chawl, Hind.
Riso. It.
Bras, Mal.
Tandool, Mah.
Motsj, Gome, Ko, Jap.
Berunge, Pers.
Arroz, Port.
Vrihi, Sans.
Arroz, Spa.
Arisee, Tam.
Beeum, Tel.

This is one of the most extensively diffused and useful of grain crops, and supports the greatest number of human race. The cultivation prevails in Eastern and Southern Asia, and it is also a common article of subsistence in various countries bordering on the Mediterranean. It is grown in the Japan Islands, on all the sea coasts of China, the Philippine and other large Islands of the Indian Archipelago, partially in Ceylon, Siam, India, both shores of the Red Sea, Egypt, the shores of the Mozambique Channel, Madagascar, some parts of Western Africa, South Carolina, and Central America. Three species only are enumerated by Lindley:—*Oryza sativa*, the common rice, a native of the East; *O. latifolia*, a species having its habitat in South America; and *O. Nepalensis*, common in Nepaul. But there are a host of varieties known in the East; these, however, may for all practical purposes, be resolved into two kinds—the upland or mountain rice (*O. Nepalensis*, the *O. mutica*, of Roxburgh), and the lowland or aquatic species (*O. sativa*).

Rice, the chief food, perhaps, of one third of the human race, possesses the advantage attending wheat, maize, and other grains, of preserving plenty during the fluctuations of trade, and is also susceptible of cultivation on land too low and moist for the production of most other useful plants. Although cultivated principally within the tropics, it flourishes well beyond, producing even heavier and better filled grain. The chief variety of this cereal is cultivated throughout the torrid zone, wherever there is a plentiful supply of water, and it will mature, under favorable circumstances, in the Eastern continent, as high as the 45th parallel of north latitude, and as far south as the 38th. On the Atlantic side of the Western continent, it will flourish as far north as latitude 38 degrees, and to a corresponding parallel south. On the Western coast of America, it will grow so far north as 40 or more degrees. Its general culture is principally confined to India, China, Japan, Ceylon, Madagascar, Eastern Africa, the South of Europe, the Southern portions of the United States, the Spanish Main, Brazil, and the Valley of Parana and Uruguay. In 1834, 29,583 bags of rice were shipped from Maranham. At the Industrial Exhibition in London, in 1851, there were displayed many curious specimens and varieties of rice, grown without irrigation, at elevations of three thousand to six thousand feet on the Himalaya, where the dampness of the summer months compensates for the want of artificial moisture. Among these American rice received not only honorable mention for its very superior quality, but the Carolina rice, exhibited by E. I. Heriot, was pronounced by the jury "magnificent in size, color, and clearness," and it was awarded a prize medal. The jury also admitted that the American rice, though originally imported from the Old World, is now much the finest in quality.

United States.—The present culture of rice in the *United States* is chiefly confined to South Carolina, Georgia, Florida, Alabama, Mississippi

nd Texas. The yield per acre varies from
wenty to sixty bushels, weighing from forty-
ve to forty-eight pounds when cleaned. Under
vourable circumstances as many as ninety bush-
ls to an acre have been raised. Judge Don-
herty, who resides near the borders of Hender-
on county, Texas, has raised a crop of several
undred bushels of upland rice. The crop aver-
ges thirty bushels to the acre. He thinks rice
n be raised there as easily as Indian corn, and
ill be far more profitable. Another variety is
ltivated in America to a limited extent, called
ochin China, dry, or mountain rice, from its
laptation to a dry soil, without irrigation. It
ill grow several degrees further north or south
an the Carolina rice, and has been cultivated
ith success in the Northern provinces of Hun-
ry, China, Westphalia, Virginia and Maryland ;
t the yield is much less than that already stat-
l, being only fifteen to twenty bushels to an
re. It was first introduced into Charleston,
om Canton, by John Brodly Blake, in 1772.

The *American* crop of rice in 1848, reach-
162,058 tierces in market, and of these
9,330 tierces were exported from South Caro-
a. The largest rice crop grown in South Caro-
na for the past thirty years, was in 1847,
en 192,462 tierces were raised ; 140,000 to
0,000 is about the average, and it has only
ceeded 170,000 on four occasions.

Rice being an aquatic plant, is best grown in
moist lands, that are easily inundated. The
ound is ploughed superficially, and divided in-
squares of from twenty to thirty yards in the
les, separated from each other by dykes of
rth about two feet in height, and sufficiently
oad for a man to walk upon. These dykes are
retaining the water when it is required, and
permit of its being drawn off when the inun-
tion is no longer necessary. The ground pre-
red, the water is let on, and kept at a certain
ight in the several compartments of the rice
ld, and the seedsman goes to work. The rice
t is to be used as seed must have been kept
the husk ; it is put into a sack, which is im-
rsed in the water until the grain swells and
ows signs of germination ; the seedsman, walk-
through the inundated field, scatters the seed
h his hand, as usual ; the rice immediately
ks to the bottom, and many even penetrate to
ertain depth in the mud.

Piedmont.—In Piedmont, where the sowing
es place at the beginning of April, they gene-
ly use about fifty-five pounds of seed per acre.
In *Piedmont* the usual return of a rice field is
koned at about fifty for one.

Mauritius.—In the *Isle of France* rice is culti-
ed in very damp soils, upon which a great
l of rain falls, but which are not flooded, as
other tropical countries : but the process is
so certain nor the crop so great, as when
ndation is employed.

At *Munzo,* in New Granada, the paddy fields which are not inundated, under the influence of a mean temperature of 26 deg. centigrade (79·0 deg. Fahrenheit), yield 100 for 1.—(Simmonds's "Colonial Magazine," vol. xi., p. 92.)

The rice now grown about *New Orleans* is as sweet, if not sweeter, than that imported from South Carolina, but it is deficient in hardness and brightness when ready for market, a defect owing entirely to two causes, neither of which is beyond the control of the planter. The one cause is the mode of culture, it being generally grown without due attention to the seed—seeded at too late a period of the season, and allowed to become *rare-ripe* upon the stalk. The other cause is the very imperfect mode of its preparation for market; this being invariably accomplished by the primitive pestle and mortar, or the old-fashioned "pecker mill." The same seed is planted in the same soil from year to year, a system which, it is generally conceded, will deteriorate the quality and production of any grain crop. A very large proportion of the rice grown in Carolina is prepared for market at the steam toll-mills, in the vicinity of Charleston; and a mill of this description near New Orleans, would remedy the greatest defect in the rice of the country, greatly increase the demand for the article, and undoubtedly yield a large return for the investment. The toll mills at and around Charleston are, and always have been, prosperous. The mills of Mr. Lucas, in England, erected to clean "paddy," *i. e.* "rough rice," sent there in bulk from Carolina, have succeeded also, and have increased the consumption of the article in that country. The "rough rice," "paddy," or grain, as it comes from the ear, is composed, first, of a rough, silicious outer covering, impervious to water, which is very useful in the neighbourhood of cities, for filling up low lots or pools, for horse beds, and for packing crockery and *ice*, being far better for the latter purpose than the saw-dust used; second, a brown flour or bran, lying directly under the outer covering; and third, of the clean or white rice. There is no question that, as a common diet, it is better adapted to the climate of Louisiana than Indian corn; and it can be grown on the hitherto *waste lands of the sugar plantations*; it is always substituted by the physician, when practicable, as the food best adapted to the laborer, in season of diarrhœa and other similar diseases, is *perferred* before any other grain by the negro; and if the clean rice be ground and bolted, a meal is produced which can be made up into various forms of cake and other bread, of unrivalled sweetness and delicacy. The outer flour, or brown bran, which is separated from the chaff at the toll mill, is known as "rice flour," and corresponds to the "bran" of wheat, it is a most excellent food for horses, poultry, pigs and *milch cows*, and would always command a ready sale in New Orleans. It is used extensively for these purposes at and around Charleston, and is shipped thence, by the cargo, to Boston and other Northern ports. After other great impediments were removed, one formidable difficulty still remained in the way of the rice planters, and that was the threshing of the crop by flail. The labor requisite, to accomplish the threshing was so great, that we once heard a distinguished planter say, while having one large crop threshed out by flail, that he would regard another large crop as a calamity. Previous to 1830 threshing mills had been tried by various individuals, but with no apparent success. In that year the attempt was renewed, and the first trail of a thresher, constructed in New York, was tested on Savannah river, under the auspices of General Hamilton. The machinery was driven by apparatus similar to that employed for driving the cotton gin. The result was not very satisfactory, but there was ground for hope, and after an outlay of very large sums, and after many disappointments the happy expedient was thought of, of testing the mill with steam instead of animal power. The experiment was completely successful, and it was manifest at once that the difficulties had not been in the imperfect construction of the thresher, but in the insufficiency of the moving power. It is now twenty years since the first working of the small mill alluded to, and the rice threshing-mill, with steam-engine attached, is now a splendid piece of operative machinery. The rice in sheaf is taken up to the thresher by a conveyor, it is threshed, the straw taken off, then thrice winnowed and twice screened, and the result in some cases exceeds a thousand bushels of clean rough rice, the work of a short winter day. We had the rare opportunity, a few years since, of seeing a Chinese book on rice planting, which contained many engravings. The language we could not read, but we comprehended a sufficient number of the engravings to institute a comparison between their system and our own, and the result was, in our method of irrigation we were their equals, while in economy of cultivation, and in the preparation of the grain for market and for use, we are greatly their superiors. Again, some six or seven years since the East India Company, of London, sent an agent to this country to procure American cotton seed, gins and overseers, for the purpose of testing the practicability of raising cotton by our method in India. This agent, Captain Bayles, when in Savannah, was heard to say that he had especial directions from the Company to inform himself minutely of our system of rice culture. Here, then, was an embassage from the banks of the Ganges, a spot where rice has been cultivated probably for twenty centuries, to inquire into the method of cultivation and preparation, of a people amongst whom the grain had no existence one hundred and sixty years ago." The following is the mode of culture for rice in Carolina:—It is sowed as soon as it conveniently can be after the vernal equinox, from which period until the middle, and even the last of May, is the usual time of putting it in the ground. It grows best in low marshy land, and should be sowed in furrows twelve inches asunder; it requires to be flooded, and thrives best if six inches under water; is occasionally drained off, and turned on again to overflow it, for three or four times. When ripe the straw becomes yellow, and it is either reaped with a sickle, or cut down with a scythe and cradle, some time in the month o September; after which it is raked and bound, o got up loose, and threshed or trodden out, an winnowed in the same manner as wheat o barley.

Husking it requires a different and particula operation, in a mill made for that purpose. Thi mill is constructed of two large flat woode cylinders, formed like mill-stones, with channel or furrows cut therein, diverging in an obliqu direction from the centre to the circumference made of a heavy and exceedingly hard timber called lightwood, which is the knots of the pitc pine. This is turned with the hand, like th common hand-mills. After the rice is thu cleared of the husks, it is again winnowed, whe it is fit for exportation.

A bushel of rice will weigh about sixty-si pounds, and an acre of middling land will produce twenty-five bushels.

Various machines have been contrived fo cleaning rice, of which one secured by patent t Mr. M. Wilson, in 1826, and thus described b Dr. Ure, may be regarded as a fair specimen :—It consists of an oblong hollow cylinder, laid i an inclined position, having a great many teet stuck in its internal surface, and a central shaf also furnished with teeth. By the rapid revol tion of the shaft, its teeth are carried across th intervals of those of the cylinder, with the effe of parting the grains of rice, and detachi whatever husks or impurities may adhere them. A hopper is set above to receive the ric and conduct it down into the clear cylinde About eighty teeth are supposed to be set in th cylinder, projecting so as to reach very near the central shaft, in which there is a correspon ing number of teeth, that pass freely between th former.

The cylinder may also be placed upright, horizontal if preferred, and mounted in any convenient framework. The central shaft should put in rapid rotation, while the cylinder receiv a slow motion in the opposite direction. Th rice, as cleaned by that action, is discharged the lower end of the cylinder, where it falls in a shute, and is conducted to the ground. T machine may be driven by hand, or by any oth

onvenient motive power.—*Dict. of Arts and*
lanufactures. The growth of rice in North
merica is almost wholly confined to two States
ine-tenths of the whole product, indeed, being
aised in the States Carolina and Georgia. A
ttle is grown in North Carolina, Lousiana, and
lississippi. The aggregate crop, for 1843,
mounted to 89,879,185 lbs., while in 1847
had risen to 103,000,000 lbs. Besides the
merican rice which is raised in the water, there
also the dry, or mountain rice, which is raised
some parts of Europe on the sides of the hills.
is said to thrive well in Cochin China, in dry
ght soils, not requiring more moisture than the
ual rains or dews supply. By long culture
e German rice, raised by the aid of water,
stated to have acquired a remarkable degree
hardness and adaptation to the climate. The up-
nd rice of the United States is thought by some
be only a modified description of the swamp rice.
will grow on high and poor land, and produce
ore than Indian corn on the same land would do,
en fifteen bushels, when the corn is but seven
shels. The swamp rice was originally cultivated
high land, and is not so now, because it is
ore productive in the swamp, in the propor-
n, as is said, of twenty to sixty bushels per
e; and the use of water likewise, it is stated,
kes it easier of cultivation, by enabling the
nter to kill the grasses. It is thought that on
h high land, rice may be made to produce
enty-five or thirty bushels to an acre in a
od season. A new variety of rice is mentioned
having been discovered in South Carolina, in
38, called the big-grained rice. It has been
ved to be unusually productive. One gentle-
n, in 1840, planted not quite half an acre with
s seed, which yielded forty-nine and a half bush-
of clean winnowed rice. In 1842, he planted
) acres, and in 1843, he sowed his whole crop
h this seed. His first parcel when milled,
s eighty barrels, and netted half a dollar per
. over the primest rice sold on the same day.
other gentleman also planted two fields in
39, which yielded seventy-three bushels per
e. The average crop before from the same
ls of fifteen and ten acres, had only been
ty-three bushels per acre. The experiment
ultivating rice in France appears to have suc-
led perfectly. A piece of ground of 100
tares in extent (250 acres) was sown with
in 1851, in the lands of Arcachon, near Bor-
ux, and the crop proved a highly satisfactory
. The seed is sown about the middle of
il, and almost immediately appears above
und. Rice may be kept a very long period
he rough—I believe a lifetime. After being
ned, if it be prime rice, and well milled, it
keep a long time in any climate; only when
nt to be used (if old) it requires more careful
lling to get rid of the must, which accumu-
s upon it. Some planters—the writer among the number—prefer for table use rice a year old to the new. The grain is superior to any other provisions in this respect. If a laborer in the gold diggings, or elsewhere, takes with him two days' or a week's provisions, in rice, and his wallet happens to get wet, he has only to open it to the sun and air, and he will find it soon dries, and is not at all injured for his purpose. Rough rice may remain under water twenty-four hours without injury, if dried soon after.

Passing eastward, rice begins to be found cultivated in Egypt, becomes more general in Northern India, and holds undisputed rule in the Sea Boards of peninsula of India, in China, Japan, and the Eastern isands—shares it in the west coasts of Africa with maize, which, on the other hand, is the exclusively cultivated corn plant of the greatest part of tropical America, with only some unimportant exceptions. On the coast of Africa rice ripens in three months; they put it under water when cut, where it keeps sound and good for some time.

Rice is now the staple commodity of Bourbon, and it produces about 26,000 quintals annually. It forms, together with maize and mandioc, the principal article of food amongst the negroes and colored people.

The Bhull rice lands of Lower Sind.—Like all large rivers which flow through an alluvial soil, for a very lengthened course, the Indus has a tendency to throw up patches of alluvial deposit at its mouth; and these are in Sind called *bhulls*, and are in general very valuable for the cultivation of the red rice of the country. These *bhulls* are large tracts of very muddy swampy land, almost on a level with the sea, and exposed equally to be flooded both by it and the fresh water; indeed on this depends much of the value of the soil, as a *bhull* which is not at certain times well covered with salt water, is unfit for cultivation. They exist on both sides of the principal mouths of the Indus, in the Gorabaree and Shahbunder pergunnas, which part of the province is called by the natives "Kukralla," and was in olden days, before the era of Goolam Shah Kalora, a small state almost independent of the Ameers of Sind. On the left bank of the mouths of the river these *bhulls* are very numerous and form by far the most fertile portion of the surrounding district. They bear a most dreary, desolate, and swampy appearance—are intersected in all directions by streams of salt and brackish water, and are generally surrounded by low dykes or embankments, in order to regulate the influx and reflux of the river and sea. Yet from these dreary swamps a very considerable portion of the rice consumed in Sinde is produced; and the Zemindars, who hold them, are esteemed amongst the most respectable and wealthy in Lower Sind. To visit a *bhull* is no easy matter. Rout by land there is none, and the only way is to go by

boat, in which it is advisable to take at least one day's provisions and water, as the time occupied in the inspection will be regulated entirely by the state of the tide and weather. Very difficult is it too, to land on any of these places the mud being generally two or three feet deep, and it is only here and there that a footing can be secured, in the embankment surrounding the field. Let me now describe the mode of cultivating these anomalous islands, floating as it were in the ocean, and deriving benefit both from it and the mighty river itself, whose offspring they are. Should the river during the high season have thrown up a *bhull*, the Zemindar selecting it for cultivation, first surrounds it with a low bund of mud, which is generally about three feet in height. When the river has receded to its cold weather level, and the *bhull* is free of fresh water (for be it remembered, that these *bhulls* being formed during the inundation, are often considerably removed from the river branches during the low season), he takes advantage of the first high spring tide, opens the bund and allows the whole to be covered with the salt water. This is generally done in December. The sea water remains on the land for about nine weeks, or till the middle of February, which is the proper time for sowing the seed. The salt water is now let out, and as the ground cannot, on account of the mud, be ploughed, buffaloes are driven over every part of the field, and a few seeds of the rice thrown into every footmark; the men employed in sowing being obliged to crawl along the surface on their bellies, with the basket of seed on their backs; for were they to assume an upright position, they would inevitably be bogged in the deep swamp. The holes containing the seed are not covered up, but people are placed on the bunds to drive away birds, until the young grain has well sprung up. The land is not manured, the stagnant salt water remaining on it being sufficient to renovate the soil. The rice seed is steeped in water, and then in dung and earth for three or four days and is not sown until it begins to sprout. The farmer has now safely got over his sowing, and as this rice is not as in other cases trasplanted, his next anxiety is to get a supply of fresh water; and for this he watches for the freshes which usually come down the river about the middle and end of February, and if the river then reaches his *bhull*, he opens his bund, and fills the enclosure with the fresh water. The sooner he gets this supply the better, for the young rice will not grow in salt water, and soon withers if left entirely dry. The welfare of the crop now depends entirely on the supply of fresh water. A very high inundation does not injure the *bhull* cultivation, as here the water has free space to spread about. In fact the more fresh water the better. If, however, the river remains low in June, July, and August, and the south-west monsoon sets i
heavily on the coast, the sea is frequently driv
over the *bhulls* and destroys the crops. I
in fact a continual struggle between the salt w
ter and the fresh. When the river runs o
strong and full the *bhulls* prosper, and the sea
kept at a distance. On the other hand, the s
water obtains the supremacy when the river
low, and then the farmer suffers. In this ma
ner much *bhull* crop was destroyed in the mo
soons of 1851 and 1852, during the heavy gal
which prevailed in those seasons. The rice
subject to attacks also of a small black sea cra
called by the natives *Kookuee*, and which, wit
out any apparent object, cuts down the growi
grain in large quantities, and often occasio
much loss. The crop when ripe, which, if
goes well will be about the third week in Se
tember, is reaped in the water by men either
boats, or on large masses of straw rudely shap
like a boat, and which being made very tig
and close, will float for a considerable time. T
rice is carried ashore to the high land, where
is dried, and put through the usual harve
process of division, &c.: and the *bhull* is th
on the fall of the river again ready for its ann
al pickling.

Ceylon.—The process of preparing the fie
for rice culture, in the Kandian country, Ceylo
is very simple. When the paddy is to be cult
vated in mud, a piece of ground is enclosed in
series of squares or terraces, by ridges rais
with mud and turf; a quantity of water is dire
ed into the field from an adjacent stream or tan
and is allowed to remain on it for fifteen day
at the expiration of this time the field is ploug
ed with a yoke of buffaloes, which operation
repeated at the end of fifteen days more, whe
by the rotting of the woods and other matt
the field has become manured. After anoth
interval of fifteen days the field is again ploug
ed and the broken ridges are repaired. Eig
days after the field is harrowed, and subseque
ly rolled, or levelled; and when the water h
been let out the seed is sown, having in mo
instances been previously made to germinate,
being spread on platforms and kept wet. T
water is turned in during night, to prevent cr
and insects from destroying the seedlings, a
let out during the day; and this they contin
to do till the plants attain the height of one fo
Water is only retained in the field until the c
are half ripe, otherwise they would ripen ind
ferently and be destroyed by vermin. A vari
of coast paddy, called "moottoo samboo,"
introduced into the Kandian province in 18
which was found to produce a more abund
crop, by one third, than the native. It is of
months growth.

Kashmire.—In *Kashmire* rice is the staple
cultivation, and the practice adopted there is th
described by a writer in Simmonds "Colon

Magazine," vol. x. p. 180. It is sown in the beginning of May, and is fit to cut about the end of August. The grain is either sown broadcast in the place where it is intended to stand till it is ripe, or thickly in beds, from which it is transplanted when the blade is about a foot high. As soon as the season will admit, after the 21st of March, the land is opened by one or more ploughings, according to its strength, and the clods are broken down by blows with wooden mattocks, managed in general by women, with great regularity and address; after which water is let in upon the soil, which for the most part of a reddish clay, or foxy earthy, is converted into a smooth soft mud. The seed grain, put into a sack of woven grass, is submerged in a running stream until it begins to sprout, which happens sooner or latter, according to the temperature of the water and of the atmosphere, but ordinarily takes place in three or four days. This precaution s adapted for the purpose of getting the young shoots as quickly as possible out of the way of a small snail, which abounds in some of the watered lands of Kashmir, but sometimes proves nsufficient to defend it against the activity of this destructive enemy. When the former suspects, by the scanty appearance of the plants above the water in which the grain has been sown, and by the presence of the snail drawn up n the mud, that his hopes of a crop are likely to be disappointed, he repeats the sowing, throwng into the water some fresh leaves of the Prangos plant, which either poison the snails or cause hem to descend out of the reach of its influence. The seed is for the most part thrown broadcast nto about four or five inches of water; which depth is endeavoured to be maintained. Difference of practice exists as to watering, but it seems generally agreed that rice can scarcely have too much provided it be not submerged, except for a few days before it ripens, when a dried state is supposed to hasten and to perfect the maturity, whilst it improves the quality of the grain. In general the culture of rice is attended with little expense, although dearer in Kashmir than Hindostan, from its being customary in he former country to manure the rice-lands, which is never done in the latter. This manure, for the most part, consists of rice straw rejected by the cattle, and mixed with cowdung. It is conveyed from the homestead to the fields by women, in small wicker baskets, and is set on he land with more liberality than might have been expected from the distance it is carried. Many of the rice lands are situated much higher than might be thought convenient in Hindostan and are rather pressed into this species of culture than naturally inviting, but still yield good crops, through the facility with which water is brought upon them from the streams which fall down the face of the neighbouring hills. In common seasons the return of grain is from thirty to forty for one, on an average, besides the straw.—*Simmonds*

Himalaya.—A species of hill rice grows on the edge of the *Himalaya* mountains. The mountain rices of India are grown without irrigation, at elevations of 3,000 to 6,000 feet on Himalaya, where the dampness of the summer months compensates for the want of artificial moisture. The small reddish Assamese rices, which become gelatinous, in boiling, and the large, flat-grained, soft, purple-black Ketana rice, of Java and Malacca, shown at the Great Exhibition, were curious.—*Simmonds.*

Bengal.—The rice of *Bengal* by the exercise of some care and skill, has recently been so far improved as nearly to equal that of the Carolinas. Dr. Falconer has introduced into India the numerous and fine varieties of rice cultivated in the Himalayas; of these some of the best sort were at his suggestion distributed to cultivators along the Doab canal. On the cultivation of *rice*, the staple food of the lower provinces, and on the various crops sown after the early rice has been gathered in, as well as on the general appearance and condition of the successive umbrageous villages, wide plains, and deep or rapid rivers which make up lower Bengal, a good deal has been written in the Calcutta *Review*; and for a general description of the alluvial soil of lower Bengal we refer to Art. I. Vol. IX. The early, or *aous* rice is sown generally on high, light, and sandy soils from March to May, as showers may be favourable. It is cut variously from the end of July to the middle or end of September, and in six weeks' time, it is succeeded by what is known as 'cold weather' crop, which may be mustard, vetches, pulse, millet, *sola*, or gram, barley, oats, and the like. The *aumon* rice is sown in rich, deep, and loamy soils from April to June, and is reaped any time between the beginning of December and the end of January. It is a richer, stronger, and every way a better crop than the *aous*, but it is more exposed to inundation, and is not followed by any second crop within the year. Occasionally the early and the late crops are sown on the same land, and cut without injury to each other at different periods. A large part of the late rice is planted with the hand in rows, on land carefully ploughed, cleaned, and smoothed for the purpose. It is everywhere known as the *roa*, and yields an abundant harvest. A third kind of rice, unknown in high and dry tracts of country, but very common in extensive marshy districts, is called the *boru*, and, from its proximity to water, is sown and grown from the month of January to the end of May. It is cultivated in places where there is too great a depth of water during the heavy rains, and consequently abundance to keep the plant moist during the fierce heat of summer. The early rice, in the most favourable season, from both grain and straw, cannot give more than five rupees per beegah. In bad seasons it may not yield more than one rupee. As much as ten or even fifteen rupees may be got from the *aumon* crop in good seasons; but when heavy rains, or unexpected inundations from large rivers, drown the young plants, as was the case during 1855 and 1856, and may be the case again at any time, the return is positively nothing. The *boru* rice may be expected to yield seven or eight rupees per beegah. And on these three crops, over some hundreds of miles, the hopes and anxieties of some millions hang for a large part of the year. About the crops, there can be little dispute. The condition of those who live by such crops, we have found to be as follows:—Take a large plain, a crowded bazar on market day, or a high road between two towns or villages of any importance, and it will generally be found that the men at work on the one, or buying and selling in the other, or sturdily strutting along the third, have some title, or right, or interest, or occupancy in the soil. Nearly every man has his *jumma*, which, in plain language, is his tenant-right of occupancy, or of proprietorship. The extent of this *jumma* is, in conversation, and for all practical purposes, indicated not by the acre-age, for few can tell the area of their possession, but by the rent demanded, for every man well knows how much he is expected to pay. A *jumma* or *jote* may then vary from five rupees to one hundred rupees. It will usually be found to be from about twelve to thirty. Obviously, the possibility of a man's paying such rent, and yet finding enough to support him, will depend, apart from all fluctuations of climate, on the rent, compared to the productiveness and extent of the tenure, on the number of months which he has to support in his own homestead, and on the number of sharers who have a joint hold on the land. The shareholders in a large *jumma* of eighty or one hundred rupees we have known to reach to ten, and there are often as many as four or five on a small holding of twenty rupees. This is an inevitable consequence of the law of subdivision; but it is remarkable, how constantly this terminates, after two or three generations, in a separation of cousins, and a division of the inheritance into two or more shares, no longer to be held in common: and it is still more remarkable how this universal custom is rudely set to rights by the progress of disease, by fever, cholera, small-pox, and other scourges, which clear off whole families, and cause the inheritance to revert to the hands of a single member. If on the one hand, numerous instances may be found of families branching out, till they seem to weigh down the minute holding,—on the other, cases as frequent will occur, where father, and uncles, with their offspring, have all been swept away, and the patrimonial inheritance has reverted to a single individual, with, it may be, the surviving female relations all dependent upon his exertions for bread. The *jumma* or holding will naturally be divided between a homestead, or *beeta*, with, it may be, some garden land attached to it, and the outfield in the plain, with its early or late rice, or both. The main question relative to outfield and infield will, of course, be the average amount of rent. We have said that few ryots know the extent of their holdings in actual *beegahs*. This is the case, in many instances, where the land has never been measured, when it will be loosely stated at twenty or thirty beegahs; but where it has been measured, the ryot unluckily knows its extent but too well. There is in every pergunna a variable rate of assessment, but one well understood. In pergunnah Insafnuggur it is one thing; in pergunnah Zalimpore it is another. There is, we say, a general understanding, expectation, or regular consent, given, or implied, that it shall not be enhanced without some very special reason. And the question to which we now come, and which is one of the last importance, is, what is the usual average, and is it a fair one? On this point, custom and opinions vary so much, in different places, and according to the different views of payers and receivers, that it is with some difficulty, and after a great deal of research, that we have arrived at a definite conclusion. Even in villages, a higher rate on the homestead and the garden, is universal. It may be as low as Rs. 2, or as high as Rs. 3-8 or Rs. 4, but the average may be taken as Rs. 2-8 or Rs. 2-12. Such rate, in itself, is nothing intolerable. What is a fair rent for the land which yields one splendid crop, or two average crops in the year? We find that the rent of this land varies from as low as 8 annas a beegah to Rs. 2-13 and even Rs. 3, which is pretty much the same as saying that rent in England ranges from eighteen shillings or one pound an acre to fifty and fifty-five shillings. In Bengal the extremes are rare. The land may be too sandy, or too low, or too sterile, or impregnated with salt, or culturable only after a rest for a year or ten months, and in these cases, a rate of from ten to fourteen annas is quite as much as it can bear. If rich and loamy, it may well bear from eighteen annas to Rs. 1-4. But repeated investigation has satisfied us, that a ryot holding a *jote* of twenty beegahs, composed of homestead, high land, and deep land, pays on the whole a higher rate than this. Were the whole of the twenty beegahs assessed at no more than a rupee per beegah, we should have little to say in favour of a reduction. But when the homestead pays Rs. 2-8 or Rs. 3, the deep rice land Rs. 1-8, Rs. 1-12 or Rs. 2, and the lighter soils from twelve annas to Rs. 1-2, as we have found that they do pay repeatedly, it is clear that the ryot has a burden laid on him, which it requires constant exertion, without intermission from sickness, litigation, or any other cause, as well as a succession of favourable seasons, to enable him to support. In round numbers one rupee a beegah, or Rs. 1-2, and perhaps Rs. 1-4 in very favourable localities, would be a fair and equitable assessment. But we find in some *pergunnahs*, that Rs. 1-4, and in others that Rs. 1-6, and Rs. 1-12, or Rs 2 are the regular rates. Add to this occasional cesses, with an increasing family, and the families of other shareholders increasing as well, and it is very conceiveable that the ryot has no easy task to perform. We have found *zemindaries* where the best soils were taxed at no more than Rs. 1-2 a beegah, and the worst as low as eight annas. We can point to others where the same soils are taxed respectively at Rs. 1-4 and Rs. 2-8. The difference between the condition of the cultivator, in each instance, is almost as easy to compute as the difference of the above sums.

To meet the rent as above described, the ryot or tenant proprietor cultivates his land in one of the three following ways: 1, by his own thews and sinews: 2, by the labour of hired servants: 3, by the system of *barga*. By far the greater part of the rice crop is sown and grown by those to whom the holding belongs. The ploughing, crushing, and harrowing, the casting of the seed, the weeding during the rainy season, the cutting and carting, are most frequently all done by the holders of the *jote*. Hired labour is, obviously, an indication of some advance in civilization, or of some substance and well-being. It is the frequent resource of men who have taken service under Government, or under Zemindars, or who have some other means of livelihood, or who with an under tenure, comprising one or more villages, retain in their own hands a small home farm. The third method of cultivation is very frequent. The proprietor having neither the skill, nor the time, nor the muscle, to sow and plough himself calls in a person whom he terms the *bargadar*. This person brings his own plough, bullocks, and seed, and his own person and goes through all the agricultural operations, which commence in April and end in December. Having done this without any advances from the proprietor,—who does not always give one-half the seed, as stated by Mr. Wilson in his glossary,—the bargadar, at harvest-time, gets for his pains, just one-half the crop. The arrangement suits the convenience of both parties. The tenant is saved the exertion of cultivating and can follow any other business. The bargadar, who may work in one village this year, and in another the next, is saved anxieties about leases, exactions, bonuses, and payments of rent, &c. In the very worst of seasons, he has lost nothing beyond his seed and his labour. But of the three methods of cultivation, the most frequent as well as the most successful, is the first. We have heard ryots admit that, if a man wanted careful ploughing, sowing, and planting, the young plant to be well weeded, and the surplus water to be regularly carried off, with a first-rate crop at the end of all, there was nothing for it but to do everything himself. We have heard from Englishmen many philanthropic complaints of indifferent agriculture, coarse implements, perfunctoriness in the manual operations, and bad crops. We are ready to admit that the tools are primitive, that the ryot is often lazy, and that there is little change in the system of cropping from one year to another; but the charge of bad results for *common*, and not *unusual* crops, we entirely deny; nay, we are fully prepared to go further, and show that not in any part of England itself, with all the elaborate ploughs of modern invention, are there to be shown such specimens of finished and successful husbandry. We have seen, this year soil crushed, smoothed, and weeded, till it more resembled a suburban garden on the South-western railway line, than a common piece of rice land in the plains of Bengal. There may be a field for improvement or experiment in the various crops, other than rice, which are sown and cut from the commencement to the close of the cold season. A knowledge of the best system of rotation, and of the best and simplest ways of manuring and irrigating such crops, is what the ryot has not got, and what it would be well to give him; fruit trees and vegetables, if properly looked to, would become more valuable. And there is little doubt that as railways are extended through eastern and northern Bengal, there will be many more inducements to the ryot to cultivate those productions, which find a ready sale only in large stations and prosperous cities. But, with all this a very large surface of ground will ever remain fitted for rice cultivation alone. This must be the case until scientific men shall discover some means of draining off the accumulation of water of the rainy seasons, which the thousand natural outlets of the country have yet failed to do; or some article of general consumption be found, which possesses the peculiar faculty of growing in from six inches to feet six of water, and which, with a fair chance given it will beat Neptune in a race for life or death. On the other hand, we are ready to admit that there may be several places, where by cutting a canal and letting the water run off into some deep river, having its exit in the Sunderbunds, a good many acres of land might be saved from annual inundation, and bear crops of rice, instead of jungle with a broad blade. But such places are suited to engineering and not to agricultural triumphs; and we must again repeat our conviction that persons intending to teach the ryot some parts of his trade, would be rather surprised to find how very much they had yet to learn. His knowledge of seed-time, and of harvest, and the general water-shed of his part of the country, is hardly susceptible of improvement; while the pains and labour, though unwilling, with which considerable patches of ground are cleaned and smoothed for the reception of rice plants, dibbled in by rows, with the hand, after being grown in a sort of nursery, as well as the results of these diverse operations, would be worthy of all praise in an agricultural show in England. We must now say a word or two on the implements, by which these gratifying results are attained. Most readers must have seen a Bengali plough at some time, or have seen its print. Looking like a rude sort of anchor,it might excite the contempt of a sturdy English yeoman, or the surprise of the classical student who remembered the unmanageable instrument described by Virgil in a well-known passage of the Georgiecs. But this rude implement is suited to the means and capacity of the ryot, and to the bullocks which are to draw it. The price of this and other necessary tools may not be unacceptable to some of our readers. A very common thing is for the ryot to find his wood, *baubul* or mangoe, the former being preferred for its hardness, as well as the piece of iron for the share, and then to go to the carpenter of the village,who for a remuneration of four annas, will "fix" him a plough! It is usual too, to give this functionary a general retainer for the year, in the shape of a maund of rice in the husk, in consideration of which he is to make and repair the plough and other agricultural weapons; or the ryot may buy his plough ready made. In any case the whole expense will not exceed Rs. 1-4 or 1-8 for wood, iron, and workmanship; and the article may last one, two, or even three years. The prices of bullocks, which draw the plough or the cart, if the ryot is lucky enough to possess one, vary according to the size and strength of this animal. A young and vigorous bullock will fetch from eight to ten, twelve, and even sixteen rupees. Twenty rupees for a good pair is not an uncommon price. Weak and puny animals, or those whose best days are past, will cost four, five, or six rupees each. Eight rupees is about an average price. After the plough comes naturally the harrow. But this implement is a very different affair from the iron-toothed harrow of Europe. It is nothing more or less than two bamboos tied parallel to each other by cross pieces of wood, so as to form a regular ladder about eight feet long. The bullocks being harnessed, a couple of men take their stand on the ladder, so as to increase its weight, when it is dragged repeatedly over the field on which the seed has been cast, till every clod is pulverised, and the whole surface is perfectly smooth. We might term this a clod-crusher; the natives call it a *bida* or *bichara*. It costs about two annas, and may be put together by the ryot himself. The instrument which resembles a harrow, in that it shows one single row of wooden teeth, is not employed till the seed has shot up some inches above the ground, when it performs somewhat of the duty which the 'scuffler' performs in England, preventing the soil from caking and hardening, without tearing up the young and tender plant. This instrument may be purchased for about six annas. Add to this a small hand spud for weeding, which costs about three pice; a fish basket to catch, rather than to carry fish, which costs about three annas; a triangular fish net, which is worth about five annas; a *kodali* or mattock, which, however is not universally needed, worth little more than a rupee; a *doa* or bill-hook worth about eight or ten annas, —and we have the complete stock in trade of a very considerable portion of the labouring population of Bengal. So much for the implements of the ryot. Take them altogether,we do not think it unwarantable to assert that of acute misery, helpless indigence, and downright wretchedness, there is really very little in Bengal. Heat is at least as bearable as extreme cold. They have not had a famine for three quarters of a century, and it is only this year 1857 that we had complaints from some quarters that the ryot, owing to the scarcity and dearness of rice, has not had his two meals a day. The poor man has in this country, like the poor man elsewhere, a certain amount of inevitable hardship. Agricultural operations demand *considerable*, not to say severe, labour. A ryot, we will say, gets up in the morning, when he eats his *pan* and *supari*, or betelnut and leaf, if he can afford it, or takes a few whiffs of his hookah. Going to the field about eight, nine, or ten o'clock, he comes home for his mid-day meal, except at ploughing-time, when if delay be highly objectionable, his food is sent out to him by one of his sons or nephews. After eating, he returns to work again, often till past sunset. An active limbed man will plough one beegah a day, but will drive the clod-crusher or the harrow over eight or ten times that extent. It is a very good day's work, when weeds are plentiful, to clear one quarter of beegha of rice land, if so much. And to plant a whole beegah with rice stalks, sown elsewhere and transplanted at a favorable moment, is enough for three men in a day. This latter operation is especially fatiguing, as the workman is constantly in a stooping position. Weeding is comparatively easy, though the feet and ancles are soaked in mud and water for hours, because the ryot literally squats down with an umbrella of matting fixed tightly over his head, without a handle, and moves on gradually as he clears a little circle around him. A pleasing feature in these operations is the invariable custom of the ryots to help each other. Half the village turn out and weed the plot of Gopal one day, of Tin Kouri the next, and of Panchoo on the third. The rice gets thus a regular clearing on one and the same date, and two or three clearings are enough for an ordinary crop.

Arracan.—The fertility of the province of *Arracan* is very great, its soil being fit for the culture of nearly all tropical productions; rice, however, is alone cultivated to any great extent; the low alluvial soil which extends over the whole country, from the foot of the mountains to the sea, being admirably suited for its growth. About 115 square miles are under culture with rice. The export trade in rice of the district, is seen by the following statistical return; and it gives employment to from 400 to 700 vessels, aggregating 60,000 to 80,000 tons.

QUANTITY OF PADDY AND RICE EXPORTED FROM AKYAB, THE PORT OF ARRACAN.

	Maunds of paddy.	Maunds of rice.	Total of Rupees.	Average price per 100 baskets of 12 seers, in Rupees.			
				Rice.		Paddy.	
1831-32	380,600	28,870	130,591	15·4 to	16·6	8 to	9
1832-33	502 740	175,560	232 918	16	17	7·5	8
1833-34	555,540	418,950	430,830	19	20	9	10
1834-35	127,050	260 650	176,717	18	19	8	9
1835 36	783,870	548,460	354,791	10	11	5	5·8
1836-37	1.737,841	641,010	666,732	10·8	12	5	5
1837-38	1,621,569	248,783	650,385	21	23	9	10 8
1838-39	1,364,100	332,380	821,168	24	25·1	8 8	11 12
1339-40	2,033,698	529 961	1,121,318	21 8	23	9·8	10
1840 41	2,212.068	446,941	1,131,087	20	21·8	10	11
1841-42	1.265.388	270 000	553,014	19	20	8	9
1842 43	1.310,900	393 900	472,889	14	15	7·8	8
1843 44	848,922	707.780	633,710	17	18	7	8

—(" Colonial Magazine," vol. vi, p. 348.)

TENASSERIM EXPORT OF RICE FROM MOULMEIN.

		Baskets.		Value.
1840	… …	67,318	… …	38,708
1841	… …	11,175	… …	6,900
1842	… …	64,055	… …	40,034
1843	… …	35,635	… …	45,289
1844	… …	71,822	… …	44,529
1845	… …	149,815	… …	73,034
1846	… …	193,267	… …	101,465

—(Simmonds' " Colonial Magazine," vol. xii., . 462.)

From *Tavoy* and *Mergui*, rice was export-l, equal in value to 41,000 rupees, in 1846; 00 baskets of 12 seers each, are equal to 30 engal maunds. The basket of rice named ove, is equal to 55½ lbs. English Paddy eans rice in the husk—rice, the grain when nhusked—a distinction to be kept in mind. he daily average consumption of rice in a family f five, is rated in the Straits' Settlements at hree and a quarter chupahs.

The *Burmese* and *Siamese* are the grossest nsumers of rice. A common laboring Malay quires monthly 30 chupahs, or 56 pounds of ce, value 3s. 9d. or 4s. The Burmese and iamese about 34 chupahs, or 64 pounds.

Rice land in *Penang* yields a return which cannot be averaged higher than seventy-five fold—or nearly thirty guntangs of paddy for each orlong (1⅓ acres); but it has been considered advisable to rate it there at sixty fold only.

The rice land of *Province Wellesley* gives an average return of 117½ fold; the maximum degree of productiveness being 600 guntangs of paddy to an orlong of well flooded, alluvial land, or 150 fold, equal to 300 guntangs of clean rice, weighing nearly 4,520 English pounds. The present average produce has been very moderately estimated at 470 guntangs the orlong of paddy. The quantity of seed invariably allotted for an orlong of land is four guntangs. In Siam, forty fold is estimated a good average produce. At Tavoy, on the Tenasserim coast, the maximum rate of productiveness of the rice land was, in 1825, and is still believed to be, nearly the same as the average of Siam; while their *average* was only twenty-fold.—(Low, on " Straits Settlements.")

Rice in *Cochin-China* is the " staff of life," and forms the main article of culture. There are six different sorts grown; two on the uplands, used for confectionery, and yielding only one crop annually; the other sorts affording from two to five crops a year; but generally two, one in April and another in October; or three when the inundations have been profuse.

China.—The late Dr. Gutzlaff stated, at a meeting of the Statistical Society of London, that the population of *China* was about 367,000,000, and the returns of the land subject to tax as used in rice cultivation there, gave nearly half an acre to each living person; and he further stated that in the southern and well watered provinces, it is anything but uncommon to take two crops of rice, one of wheat, and one of pulse, from the same land in a single season. Rice is the only article the Chinese ever offer a bounty for; the price fluctuates according to the seasons, from one and three-quarter dollars to eight dollars per picul. Siam and the Indian Islands, particularly Bali and Lombok, supply the empire occasionally with large quantities. The price of rice in China varies according to the state of the canals leading to the interior; if they are full of water the prices rise; if on the contrary they are low, prices fall in proportion at the producing districts. The amount of consumption is controlled, in a considerable degree, by the cost of transit; when this is cheap prices rise from the general demand; but when land-carriage to any extent has to be resorted to, they fall; it raises prices so much at any great distance, that rice must be used very sparingly, from its enhanced price. It is obvious that if the waters are sufficiently high to allow a boat to pass fully loaded, she does so at an expense of nearly 50 per cent. less than she would do, if, from want of water, she could only take half the quantity; when transport is cheap every one obtains a full supply; when it is dear the rice districts have more than they can consume. In England, people are so much accustomed to the facilities of transit offered by railroads, canal boats, &c., that we do not readily take into consideration, that in China, except by water, all articles are conveyed from one place to another on men's shoulders. Taking the population of Canton at the usual estimate of a million, and allowing to each a catty a day, the quantity of rice required for one day's consumption alone in that city would be 10,000 piculs, of 133 lbs. each= 1,340,000 lbs.—*Simmonds' Comml. Products.*

During the growth of the rice the fields are always kept flooded when water can be obtained. The terraces near the base of the hills are supplied by the mountain streams, and the fields which are above the level of any adjoining river or canal are flooded by the celebrated water wheel, which is in use all over the country. These machines are of three kinds. The principle in all of them is the same, the only difference being in the mode of applying the moving power, one is worked by the hand another by the feet and the third by an animal of some kind, generally a buffaloe or bullock. The rice lands are kept flooded in this way until the crops are nearly ripe, when the water is no longer necessary. It is also necessary or at least advantageous to go over the ground once or twice during the summer, and stir the soil up well amongst the roots, at the same time removing any weeds which may have sprung up. If the weather is wet, the fields retain the water for a considerable time, and then it is not an uncommon sight to see the natives wading nearly up to the knees in mud and water, when they are gathering in the harvest. In the Island of Chusan, and over all the rice country of Cheking and keangsoo, there are two plants cultivated in the winter months, almost exclusively for manure; the one is a species of Coronilla; the other is Trefoil, or clover. Large ridges not unlike those on which gardeners grow celery, are thrown up on the wet rice-fields in the autumn, and the seeds of the plants are dropt in, in patches at five inches apart, on the surface of the ridges. In a few days germination commences, and long before the winter is past the tops of the ridges are covered with luxuriant herbage. This goes on growing until April, when it is necessary to prepare the ground for the rice. The ridges are then levelled and the manure plants are scattered in a fresh state over the surface of the ground. The fields are flooded, and the plough and harrow are employed to turn up and pulverise the soil. The manure thus scattered over the ground and half buried amongst the mud and water, begins to decay immediately, and gives out a most disagreeable putrid smell. This mode of manuring is generally adopted in all the rice lands in this part of China, and the young paddy doubtless derives strong nourishment from the ammonia given out in the decomposition of this fresh manure. Firewood is so scarce in the country that a great portion of the straw. cotton stalks, and grass which would go to manure the, fields, is used for firing, and therefore, the plan of growing manure for the land is forced upon the farmers by necessity. The plan of using manure in a fresh state, instead of allowing it first to decay, has doubtless been found from long experience to be the best for the young paddy. The Chinese farmer is not a Chemist, he knows little or nothing of vegetable physiology, but his forefathers have hit accidentaly upon certain systems which are found in practice to succeed, and to these he himself adheres and hands them down unchanged to his children.—*Fortune's Wanderings, page* 308.

Java is the granary of plenty for all the Eastern Archipelago; and the Dutch East Indi Company occupies itself in this culture with solicitude, well persuaded that a scarcity of rice might be fatal to its power. Ordinances to encourage and increase this branch of agriculture; have been promulgated at different times by an authority called to watch over the physical well-being of many millions of inhabitants.

As an evident proof that the culture of rice, of which it would be difficult to fix the quantity produced annually, increases considerably, I may mention that the exportation from Java, in 1840 was 1,488,350 piculs of 125 Dutch lbs.

Rice is cultivated in Java in three systems: The name of *sawah* is given to the rice fields which can be irrigated artificially; *tepar*, or *tagal* are elevated but level grounds; and *gagah*, or *ladang*, are cleared forest grounds. The two last only give one crop; a second crop may be obtained from the *sawah*, which then most commonly consists of *katjang*, from which oil is extracted in *kapus* or fine cotton, and in *ubie*, a kind o potato.

There are, says Mr. Crawfurd, two distinc descriptions of rice cultivated throughout th Indian islands, one which grows without th help of immersion in water, and another fo which that immersion is indispensably requisite In external character there is very little differenc between them, and in intrinsic value not much The marsh rice generally brings a somewha higher price in the market. The great advan tage of this latter consists in its superio fecundity. Two very important varietie of each are well known to the Javanese husbandman, one being a large productive but delicate grain, which requires about sever months to ripen, and the other a small, hardy and less fruitful one, which takes little more tha five months. The first we constantly find culti vated in rich lands, where one annual crop only is taken; and the last in well watered lands but of inferior fertility, where two crops may b raised. Both of these, but particularly th marsh rice, is divided into a great number of sub-varieties, characterised by being awned or otherwise, having a long or round grain, or being in color black, red, or white. The most singular variety is the *Oryza glutinosa*, of Rumphius. This s never used as bread, but commonly preserved as a sweetmeat. The rudest, and probably the earliest practised mode of cultivating rice, consists in taking from forest lands a fugitive crop, after burning the trees, grass, and underwood. The ground is turned up with the mattock, and he seed planted by dibbling between the stumps of trees. The period of sowing is the commencement of the rains, and of reaping that of the dry easons. The rice is of course of that descrip-ion which does not require immersion. The econd description of tillage consists also in growing mountain or dry land rice. This mode s usually adopted on the common upland arable ands, which cannot conveniently be irrigated. The grain is sown in the middle of the dry sea-on, either broadcast or by dibbling, and eaped in seven or five months, as the grain appens to be the larger or the smaller variety.

The culture of rice by the aid of the periodical ains forms the third mode. The grain being hat kind which requires submersion, the pro-ess of sowing and reaping is determined with recision by the seasons. With the first fall of he rains the lands are ploughed and harrowed. The seed is sown in beds, usually by strewing ery thickly the corn in the ear. From these eds the plants, when 12 or 14 days old, are emoved into the fields and thinly set by the and. They are then kept constantly immersed n water until within a fortnight of the harvest, hen it is drawn off to facilitate the ripening of he grain.

The fourth mode of cultivating rice is by forcing crop by artificial irrigation, at any time of the ear ; thus, in one field, in various plots, the perations of sowing, ploughing, transplanting, nd reaping may be seen at the same period.

The fertile, populous, and industrious countries f the *Eastern Archipelago* export rice to their eighbours. The most remarkable of these are ava, Bali, some parts of Celebes, with the most ertile spots of Sumatra, and of the Malay Penin-la. Rice is generally imported to these western ountries from those further east, such as the pice Islands. Java is the principal place of roduction for the consumption of the other lands, and the only island of the Archipelago hat sends rice *abroad*. The rice of the eastern istricts is generally superior to that of the west-rn. The worst rice is that of Indramayu, which s usually discolored. The subdivision of the pro-ince of Cheribon, called Gabang, yields rice f fine white grain, equal to that of Carolina. he rice of Gressie preserves best. All Indian ice is classed, in commercial language, into the hree descriptions of table rice, white rice, and cargo rice. From the limited demand for the first, it is only to be had in Java, in small quantity. For the same reason the second is not procurable in large quantity, unless bespoken some time beforehand ; but the third may be had at the shortest notice in any quantity required. Java rice is inferior in estimation to that of Bengal or Carolina in the markets of Europe. The following statistics show the extent and progress of the culture in Java :—

	In 1840.	In 1841
No. of Residencies in which rice is cultivated...	18	18
No. of Regencies	69	68
„ Districts...	414	414
„ Desas or Villages. .	39,931	36,296
Amount of the population who take a part in it, without distinction of caste...	6 704,797	6,857,372
Number of families &c. ...	1,466,845	1,475,675
„ families who devote themselves to the cultivation...	1,150,406	1,146.083
Number of men bound to obligatory service...... ..	1,321 767	1,325,746
Cleared grounds in *bahus*, of 71 decametres	1,470,047	1,540,054
Upon this extent the population had cultivated for the government, in *bahus* of 71 decametres.........	78,182	74,277
Extent of fields which the population had cultivated on their own account, in *bahus*, &c............	1,286,139	1,381,216
Extent of land in fallow in *bahus*, &c.......	105,726	84,561
Produce in piculs of fields cultivated by the population on its own account...	21,273 278	23,810,573
Average Produce of a *bahu*.	16½	17
Gross amount of the land tax of 1840...	8,502,402fl.	9,030,761fl.
Extent of rice fields newly cultivated in *bahus*......	10,328	13,561

This comparative summary shows that the culture of rice increases yearly, and that the average produce of the fields is also continually increasing. These results have been obtained by the attention paid to the proper irrigation of the soil fit for this culture ; and to the hydraulic works which the Government executes on its own account in the parts of the island where rice fields can be established, and where they are required to feed a population whose number is still increasing yearly. I have seen, continues Mr. Crawfurd, lands which have produced, from time beyond the memory of any living person, two yearly crops of rice. When this practice is pursued, it is always the five-months grain which is grown. The rapid growth of this variety, has, indeed, enabled the Javanese husbandman, in a few happy situations, to urge the culture to the amount of six crops in two years and a half. Rice cultivated in a virgin soil, where the wood has been burnt off, will, under favorable circumstances, give a return of twenty-five and thirty fold. Of mountain rice, cultivated in ordinary upland arable lands, fifteen fold may be looked upon as a good return. In fertile soils, when one crop only is taken in the year, marsh rice will yield a return of twenty-five seeds. When a double crop is taken, not more than fifteen or sixteen can be expected. In the fine province of Kadu, an English acre of good land, yielding annually one green crop and a crop of rice, was found to produce of the latter 941 lbs. of clean grain. In the light sandy, but well watered lands of the province of Mataram, where it is the common practice to exact two crops of rice yearly without any fallow, an acre was found to yield no more than 285 lbs. of clean rice, or an annual produce of 560 lbs.—(' *History of the Indian Archipelago.*" The low estimation of Java rice is not attributable to any real inferiority in the grain, but to the mode of preparing it for the market. In husking it, it is for the want of proper machinery, much broken, and, from carelessness in drying, subject to decay from the attack of insects and worms. When in the progress of improvement more intelligent methods are pursued in preparing the grain for the market, it will equal the grain of any other country. Machinery must be employed for husking the grain, and some degree of kiln drying will be necessary to ensure its preservation in a long voyage. I know nowhere that rice is so cheap as in Java, except in Siam, whence it is exported at one-third less cost. A great deal of rice is exported from Siam to China by the junks, and also occasionally a little from Java.

The quantity exported from

Java in	1830	was	13,521	coyans
,, ,, ,,	1835	,,	25,577	,,
,, ,, ,,	1839	,,	1,103,378	piculs.
,, ,, ,,	1841	,,	676,213	,,
,, ,, ,,	1843	,,	1,108,774	,,

Rice is grown to some extent in the Dutch portion of Celebes; it yields at a minimum one hundred and fifty fold. The average annual delivery of rice to the Government pays sixty cents for a measure of forty pounds. That which is sold for the consumption of the inhabitants may be procured at the public warehouse for a guilder the 35½ lbs.; and that which is sold for export may be had at public auction for 125 florins the coyan of 3,000 lbs.

Philippines.—The following description of some varieties of rice cultivated in the Philippine islands, is given by Mr. Rich, botanist to the United States Exploring Expedition. The varieties are very numerous; the natives distinguish them by the size and shape of their grain, viz:

a. Binambang.—Leaves slightly hairy; glumes whitish; grows to the height of about five feet; flowers in December: aquatic.

b. Lamuyo greatly resembles the above; is more extensively cultivated, particularly in Bantangas, where it forms the principal article of food of the inhabitants of the coast: aquatic.

c. Malagcquit.—This variety derives its name from its being very glutinous after boiling; it is much used by the natives in making sweet or fancy dishes; and also used in making a white-wash, mixed with lime, which is remarkable for its brilliancy, and for withstanding rain, &c.: aquatic.

d. Malagcquil.—With smooth leaves, and red glumes (all the preceding are whitish); possesses all the qualities of the aquatic variety of the same name—that of being very glutinous after boiling This rice is said to be a remedy for worms in horses, soaked in water, with the hulls on; it is given with honey and water.

e. Bontot Cabayo.—Common in Ilocos, where it is cultivated both upland and lowland; it produces a large grain, and is therefore much esteemed, but has rather a rough taste.

f. Dumali, or early rice.—This rice is raised in the uplands exclusively, and derives its name from ripening its grain three months from planting; the seed is rather broader and shorter than the other varieties; it is not extensively cultivated, as birds and insects are very destructive to it.

g. Quinanda, with smooth leaves.—This variety is held in great estimation by the people of Batangas, as they say it swells more in boiling than any other variety; it is sown in May, and gathered in October: upland.

h. Bolohan.—This variety has very hairy glumes; it is not held in much esteem by the natives, but it is cultivated on account of its not being so liable to the attacks of insects and diseases as most of the other upland varieties.

i. Tangi.—Leaves slightly hairy, glumes light violet color. This upland variety is held in much esteem for its fine flavor.

Manilla. 435,067 arrobas of rice were exported from Manilla in 1847. A simple but rude mill is in use in Siam, and many parts of India, for hulling paddy, which is similar to those used 4,000 years ago. It consists of two circular stones, two feet in diameter, resting one on the other; a bamboo basket is wrought around the upper one, so as to form the hopper. A peg is firmly set into the face of the upper stone, half way between its periphery and centre, having tied to it by one end a stick three feet long, extended horizontally, and attached by the other to another stick pending from the roof of the shed under which the mill is placed. This forms a crank, by which the upper stone is made to revolve on the other set firmly on the ground. The motion throws the rice through the centre of the stone, and causes it to escape between the edges of the two.

More starch is contained in this grain than in wheat. Braconnet obtained from Carolina rice 85·07, and from Piedmont rice 83·8 per cent. of starch. Vogel procured from a dried rice no less than 98 per cent. of starch. There are several patent processes in existence for the manufacture of rice-starch, which are accomplished chiefly by digesting rice in solutions, more or less strong, of caustic alkali (soda), by which the gluten is dissolved and removed, leaving an insoluble matter composed of starch, and a white substance technically called fibre. Under Jones's patent, the alkaline solution employed contains 200 grains of real soda in every gallon of liquor, and 150 gallons of this liquor are requisite to convert 100 lbs. of rice into starch. In manufacturing rice-starch on a large scale, Patna rice yields 80 per cent. of marketable starch, and 8·2 per of fibre, remaining 11·8 per cent. cent. being made up of gluten, gruff, or bran, and a small quantity of light starch carried off in suspension by the solution. Jones's process may be thus described:—100 lbs. of rice are macerated for 24 hours in 50 gallons of the alkaline solution, and afterwards washed with cold water, drained, and ground. To 100 gallons of the alkaline solution are then to be added 100 lbs. of ground rice, and the mixture stirred repeatedly duing 24 hours, and then allowed to stand for about 70 hours to settle or deposit. The alkaline solution is to be drawn off, and to the deposit cold water is to be added, for the double purpose of washing out the alkali and for drawing off the starch from the other matters. The mixture is to be well stirred up and then allowed to rest about an hour for the fibre to fall down. The liquor holding the starch in suspension is to be drawn off and allowed to stand for about 70 hours for the starch to deposit. The waste liquor is now to be removed, and the starch stirred up, blued (if thought necessary), drained, dried and finished in the usual way.—*Pharmaceutical Journal, Vol.* III. *p.* 138.

Rice is imported into England in bags of 1¼ cwt., and tierces of 6 cwt., not only for edible purposes, but when ground into flour, for cotton manufactures, in aiding to form the weaver's dressings for warps. Rice-meal is commonly used for feeding pigs.

	Imported. British Plantation.	Foreign.		Retained for home consumption of all kinds.
	Bags.	Bags.		Bags.
1843 ...	136,319 ...	35,125	......	60,965
1844 ...	127 876 ...	69,112	......	126,733
1845 ...	173,794 ...	5,713	......	114,933
	Tons.	Tons.		Tons.
1847 ...	38.736 ..	3,033	......	28,375
1848 ...	21,226 ...	4,631	......	15,468
1849 ..	19,397 ...	1,410	......	14,961

		Total imported.	Re-exported.
1849	... ...	976,196 cwts.	290,732 cwts.
,,	in the husk	31,828 qrs.	
1850	... ...	785,451 cwts.	248,136 ,,
,,	in the husk	37,150 qrs.	
1851	... ...	744,847 cwts.	345,677 ,,
,,	in the husk	31,481 qrs.	
1852	... ...	989,316 cwts.	414,507 ,,
,,	in the husk	23,646 qrs.	

The quantity of rice retained for British consumption, by the corrected returns, in 1850, was 401,018 cwts. and 35,119 quarters; in 1851, 399,170 cwts. and 31,481 quarters; in 1852, 574,869 cwts. and 23,946 quarters. The aggregate imports range from 40,000 to 80,000 tons annually, of which about 500 to 800 tons are in the husk.—*Simmonds, p.* 304.

Burmah and Tenasserim.—Rice is universally cultivated, and cultivation has produced many varieties. The Karens have distinctive names for more than forty, and Karen mountain rice is preferred by many to that which is raised by the Burmese on the low lands; yet it is said not to be so nutritious, and on this account bears a less price in the bazar. It is of all colors from ivory-white to coal-black. Of the black rice the Karens prepare a kind of bread, which to them supplies the place of gingerbread. A portion of seethed rice is poured into a large mortar with a prodigious quantity of sesamum seeds. Two women then take their strong ebony pestles and pound it, striking alternately until it becomes a light bounding mass. It is then thrown upon the eating stand, when the whole family seat themselves around it in oriental style, and dissever it with their sabres.

The Karens have another mode of preparing this kind of rice, which is particularly convenient for travellers. A quantity unboiled is thrust into joints of small bamboo, a little water added, and the orifice closed up. It is then roasted, and if eaten with a little butter and salt it is most delicious. The Karens select only two varieties of bamboo for this purpose, and these impart to the rice a sweet delicate flavor.—*Mason.*

India, generally.—The great staple of India, rice, is produced in every variety of soil, at every altitude and in every latitude. To name a tithe of the varieties grown would prove a tedious and useless task, for they vary with every district in which they grow. The finest of these, which is the Bengal table rice, is inferior to the Carolina kind, whilst the great bulk of them would be unmarketable in Europe, from their poverty of body and the slovenly manner in which they are prepared. The Arracan rice is a greyish opaque grain, used in England only for manufacturing starch. Copious irrigation is required for all these varieties; the Himalayan and other hill rices alone requiring no such aid, their elevation, at times as much as 6000 feet, securing them from the great heat to which the other varieties are exposed. Within the province of Bengal, as well as in the Madras low lying districts, the principal cultivation is that of rice. In most other districts this vegetable is comparatively rare. There is a great variety of the grain, differing widely in colour, shape, and weight; but the ordinary description grown does not extend beyond three or four varieties. The first sowing takes place between the end of March and the latter part of May; and as it matures and ripens within a period of about ninety days, it follows that the harvest takes place between the end of July and the middle of September. This crop is taken from sloping ground not subject to inundation, and is by far the safest, though not by any means the most abundant.

Another sowing takes place on low alluvial tracts between the middle of May and the end of June, and requiring five months to reach maturity, will be cut between November and January. This is usually the most profitable harvest, although, from the position of the land, liable at certain times to be seriously damaged by inundations; when, indeed, it is not an unusual thing for entire fields to be swept into the rivers. With some cultivators a practice prevails of *planting out* their rice from nurseries reared near their dwellings. In this case the corn is removed when about eight or nine inches high, carried carefully to its destination, which will be some spot that was, perhaps, not available at the proper sowing time; and there the young stalks will be planted in rows, and pressed down about the roots with an inclination towards the direction whence the prevailing wind blows These plants are said to thrive remarkably if properly placed, and to attain maturity in an incredibly short space of time. Sometimes a heavy flood will unexpectedly sweep away his first planting, in which case the ryot, nothing disheartened, sets to work, and repeats the task, knowing well that if it thrives it will amply repay him for his labour by its heavy crops. After the rice-harvest the ground will be sown with some of the innumerable grains met with in India; in some cases with barley, in others with gram, a kind of pulse admirably suited for the food of horses.—*Cappell's Three Presidencies.*

Rice of India, compared with American rice.—The only causes to be found for the falling off in America in the shipments and in price, (as it has not arisen from over production), are the imports of rice and paddy from Arracan, Patna, and Benares. In Arracan, taking the bulk, the Arracan rice is some 500 per-cent. cheaper than American rice in their different countries.

The Arracan sells in England for 10s or $ 2½ the cwt.
,, American. ,, ,, .. ,, 18 or 4½
Therefore it is, although the American brings 80 per cent. better prices, and freight must also be lower, that the Arracan rice is ousting the American. Why the East Indians are able to undersell the American planter, will be readily perceived from the following, which I have already stated in the Charleston Courier, &c., viz. the rice planter in India, with his wife and family, labor, in the field. The economy of the people is striking. The man's clothing consists of a strip of coarse cotton that passes between his legs, one end attached before, the other end behind, to a string that surrounds his waist. Two piecies of such clothing, of the best description, will last a couple of years; and all his year's clothing will not cost 50 cents. The diet of the people is rice, (which sometimes they use in a raw state, simply steeped in a little water), which when cooked, they eat with some few cooked vegetables mixed up with pepper, chillies turmeric, ginger, and clarified butter. Sometimes instead of vegetables they have fish, and if a goat be killed in the village, then there may be flesh instead of vegetables and fish. A man may support himself for 50 cents a month which is about the value of one rupee of their money.—*Bonynges America, page* 45.

(7160) RICE-BIRD, one of the names of the Paddy Bird, Paddee Bird, or Java Sparrow. It is the *Loxia oryzivora* of Linnæus. This well-known bird, whose plumage is well described by Buffon as being so well arranged that no one feather passes another, whilst all appear covered with that kind of bloom which is visible on plums, giving them a beautiful tint, has the bill very much developed; indeed, with the exception of *Pyrenestes* and perhaps *Coccothraustes*, this finch is the most remarkable of the race for the size and power of that organ. The colour of this bird is bloomy lead-coloured; head and tail black: bill red; belly obscurely rosy; cheeks in the male snowy; legs flesh-coloured. In Java, where it is called Glate, and the other parts of Asia where it is found, it has a very bad reputation on account of the ravages which it commits in the rice-fields with its powerful and sharp bill. In Sumatra the name of the bird is Boorong Peepee. It is often brought alive to England and confined in aviaries for the sake of its elegant shape and graceful colouring: its song, which is short and monotonous, does not much recommend it. This species must not be confounded with the Rice-Bird of America, *Emberiza oryzivora*, Linn.—*Eng. Cyc.*

(7161) RICE-FLOUR. ORYZA SATIVA; The seeds of rice contain a much less proportion of nitrogenised compounds than the other cereal grains, and particularly wheat: viz. about seven per cent:—The quantity of fatty matter is also less, and, though much difference of opinion has prevailed in reference to the value of rice as an article of diet, analysis clearly proves that it is the least nutritious of all the cereal grasses. This difference of opinion has probably arisen from the fact that rice is seldom eaten by itself, but is partaken of usually with milk, butter, or sugar, the nutritious properties of which substances have been attributed to the rice itself.—*Hassell.*

(7162) RICE GLUE, or JAPANESE CEMENT, is made by mixing rice flour intimately with cold water, and boiling the mixture. It is white, and dries nearly transparent, hence its use in making many articles in paper. When made with a smaller quantity of water, models, busts, &c., may be formed of it.—*Tomlinson.*

(7163) RICE PAPER, ARALIA PAPYRIFERA, is brought from China in plain and dyed sheets and not unfrequently with various coloured designs on them —*Faulkner.* The source of this product continued long a matter of doubt, but it is now equally certain that it is produced from the Aralia papyrifera. We refer to that article, as also to article Paper-Rice, for notices of this substance, but now confine attention to the true plant. The rice paper plant (Aralia papyrifera) presented to Mr. Fortune by J. C. Bowring, Esq., of Hongkong, was introduced to India, and is now a remarkable object of great interest in the Calcutta gardens —*A Res. among the Chi: p.* 197. About Yoksun in Sikkim, which occupies a very warm sheltered flat, many tropical genera occur, such as tall bamboos of two kinds, grasses allied to the sugar-cane, scarlet *Erythrinæ*, and various *Araliaceæ*, amongst which was one species whose pith was of so curious a structure, that Dr. Hooker had no hesitation in considering the then unknown Chinese substance called rice-paper to belong to a closely allied plant. The Chinese rice paper has long been known to be cut from cylinders of pith which has always a central hollow chamber, divided into compartments by septa or excessively thin plates. It is only within the last few years that the above supposition has been confirmed, by Sir William Hooker receiving from China, after many years of correspondence, specimens of the rice paper plant itself which very closely resembles, in botanical character as well as in outward appearance of size and habit, the above Sikkim plant.—*Hooker Jour. page* 359.

(7164) RICINUS, an apetalous genus of plants belonging to the natural order *Euphorbiaceæ*. This word is derived from 'ricinus,' the Latin name for a species of insect which the fruit of this plant was supposed to resemble. (Pliny. 'Nat. Hist,' xv. 7.) The common name of *Ricinus* is Palma Christi, a name applied to these plants by Brunfels, Matthiolus, and other older-botanists, on account of the form of its elegant lobate leaves. It was originally a native of Asia, but is now naturalised in Africa, America, and the south of Europe. The characters of this genus are:—Flowers monœcious; calyx 3- 5-parted, valvate; no petals; filaments numerous, polyadelphous: style short; stigmas 3, bipartite feathery; ovary globose, 3-celled with an ovule in each cell; fruit capsular, tricoccous; leaves alternate, stipulate, palmate, glands at apex of petiole; flowers in terminal panicles; trees, shrubs, or herbs, becoming arborescent.—*Eng. Cyc.*

(7165) RICINUS COMMUNIS, CASTOR OIL PLANT. Fructibus minoribus. Palma Christi Plant.

The Oil.

Sitti-amunakei yennai, TAM.
Bareek erundie ka tael. HIND.
Jarak, MALAY. & JAV.
Kaliki, SUNDA & MAD
Chittamindialoo noona, TEL.
Tangan-tangan, PHILIPPINE.

Ricinus Communis or common Palma Christi, is best known as producing castor-oil. It has peltate palmate leaves, with lanceolated serrated lobes; an herbaceous glaucous stem, of a purplish red-colour upwards, and flowers in long green and glaucous spikes springing from the divisions of the branches, the males from the lower part of the spike, the females from the upper; the capsules are prickly. It varies in size; in Britain it is seen seldom more than three or four feet in height, but in India it is a tree; and Clusius mentions it as measuring from two to four feet round its stem in Spain. Lindley refers several species distinguished by Willdenow to this form, namely, *R. viridis*, *R. Africanus*, *R. lividus*, and *R. inermis*. ('Flora Medica.') *R. communis*, will grow freel in Great Britain, and when sown in pots or hot-beds early in the season, and transplanted in spring, it forms a very handsome border annual. —*Eng. Cyc.* Two varieties of the Ricinus communis, one bearing small and the other large seeds, are produced all over India. The small seeded variety yields the best product, and is employed in preparing the oil exported for medicinal purposes

Mode of Preparation.—The fresh seeds after having been sifted and cleaned from dust stones, and all extraneous matters, and slightly crushed between two rollers, freed by hand from husk and coloured grains, are enclosed in clean gunny. They then receive a slight pressure in an oblong mould which gives a uniform shape and density to the packets of seed. The "Bricks" as they are technically called, are then placed alternately with plates of sheet iron in water in the ordinary screw or hydraulic press. The oil thus procured is received in clean tin pans, and water, in the proportion of a pint to a gallon of oil, being added, the whole is boiled until the water has evaporated, the mucilage will be found to have subsided and encrusted the bottom of the pan, whilst the albumen solidified by the heat, forms a white layer between the oil and the water. Great care must be taken in removing the pan from the fire, the instant the whole of the water has evaporated, which may be known by the bubbles having ceased, for if allowed to remain longer the oil which has hitherto been of the temperature of boiling water or 212° *sudden-*

ly rises to that of oil or nearly 600° thereby heightening the color and communicating an empyreumatic taste and odour. The oil is then filtered through blanket, flannel, or American drill, and put into cans for exportation. It is usually of a light straw colour, sometimes approaching to a greenish tinge. The cleaned seeds yield from 47 to 50 per cent of oil worth in England from 4*d*. to 5*d*. per lb. The following is the result of experiments made at Madras and Calcutta to ascertain the per-centage of oil in the Castor seed. (January 27th, 1853.)

Calcutta.—1400 lbs of seed yield kernels and raw oil as follows :—

	Kernels.	Oil.
1st Sort	632lbs	324 lbs.
2nd Sort	184lbs	87½lbs.
3rd Sort	164lbs	76½lbs.

Making a total of 980lbs. of kernels and 488lbs. of raw oil from 1,800lbs. of seed.

Madras.—1400 lbs. of seed yield raw oil as follows :—

1st Sort	318 lbs.	of oil.
2nd Sort	88 lbs.	do.
3rd Sort	74 lbs.	do.

Making a total of 480 lbs. of oil from 1400 lbs. of seed.

The Cost of the Madras oil is as follows :

1400 lbs. of seed at Rs. 3 3 per bag of 164lbs.	27	3	4
Husking and selecting kernels and cooly hire	3	11	9
Crushing, moulding, pressing and boiling	2	7	1
Filtering and sundries	2	8	0
Overseer's pay, Godown Rent, &c. &c.	1	6	2
300 empty Quart bottles, corks &c.	34	4	8
Cleaning and Packing charges	4	8	0
	Rs. 76	1	0

Or an average of Annas $4\frac{17}{300}$ per quart of First, Second and Third sort oil=4d per. lb.

Uses.—This oil is chiefly used as a mild Purgative. Soap of good quality may be made of it, but the cost and disagreeable smell which it communicates, preclude its general use.

Exports.—Average for the last 4 years 1849-50 to 1852-53, 11,325 galls. per annum. At the Madras Exhibition of 1851, the samples of this oil exhibited by Mr. Gay, Madras, Mr. Kohlhoff, Tanjore, and Monsieur Godefroy of Pondicherry were particularly fine. Mr. Gay's specimen was the clearest, and most limpid, and devoid of any offensive smell. These qualities however do not arise from any superiority of the seed, or care in extraction, but from repeated decolorization with animal charcoal which in the opinion of many eminent Medical men, considerably detracts from its strength and efficacy. Appavoo Pillay of Tinnevelly, the Nellore Local Committee, and Lieut. Hawkes also exhibited excellent specimens. When manufactured in the ordinary Native mill, this oil is sometimes used by the richer classes in Lamps.

Castor oil (*extracted hot*). This differs from the preceding only in the mode of preparation—The seeds are boiled for two hours in water, dried for three days in the sun, freed from the shells, pounded and then boiled in fresh water, until the whole of the oil has risen to the surface. Five seers of the seeds or $3\frac{1}{8}$ lb. should by this process yield a quart of oil. This is the sort generally used in medicine by native practitioners, it is straw colored, and free from any unpleasant taste or smell.—*M. E. J. R.*

(7166) RICINUS COMMUNIS. Castor or Lamp oil plant, Fructibus majoribus.

Vullak ennai, TAM.
Ped-amidum, TEL.
Chirach ka tael, HIND.

This oil which is obtained from the large seeded variety of the "Ricinus communis" is sometimes drawn cold, and a straw-colored specimen scarcely distinguishable in quality from the oil of the small seeded variety was shown by Lieut. Hawkes. It is however more usually extracted by heat, and forms the common "Lamp oil" of the bazar.

Mode of preparation—The seeds having been partially roasted over a charcoal fire, both to coagulate the albumen and to liquify the oil. are then pounded and boiled in water until the oil rises to the surface. The roasting process, however gives it a deeper red colour and an empyreumatic odour.

Price.—The price of this oil varies in different parts of the country from Rs. 1 10 0 to Rs. 3 13 6 per maund of 25lbs. The average of nineteen large stations, in all parts of the Madras Presidency for the Quarter ending 31st October 1854 was Rs. 2 3 6 per maund.

Uses.—Chiefly for lamps.

Exports.—Average of the last six years Galls. 27,561 per annum.—*M. E. J. R.* See CASTOR OIL.

(7167) RICINUS. A wild species from Canara. Is burnt in lamps.

(7168) RICINUS DIOCOCA.

Tawthedinbin, BURM.

Scarce and found only on the banks of streams in the Pegu and Toungboo districts. Very tall large timber; wood, red, adapted to cabinet making.—*McClelland.*

(7169) RICINUS MAPPA, 816.

(7170) RIVEA. Of this genus, Wight gives Rivea cuneata, 890; cymosa, 839; hirsuta, 891; ornata, 1356; pomacea, 888; speciosa, 851; and tiliæfolia, 1358.

(7171) RIVEA FRAGRANS.

Boodthee-keeray, TAM.

A beautiful variety of the convolvulus tribe; flowers transparent white, opening at sunset and perfuming the air with a very pleasant odour; leaves used as greens, found in hedges, called the clove scented creeper by Europeans.—*Jaffrey.*

(7172) **ROCCELLA**, a genus of Plants belonging to the family of Lichens. The species are used in dyeing, and are popularly called Orchil, or Archil. This name is derived from the Oricello of the Italians or the Spanish Orchella. It is often corrupted in commerce into Rochilla-Weed. Several species of Lichens are employed for the same purpose, which are distinguished according to the country whence they are imported, and also by manufacturers into weed and moss, the former name being applied to the Filiform Lichens of botanists belonging to the genus *Roccella* to be treated of here, whilst the terms Moss and Rock-Moss are applied to the Crustaceous Lichens belonging to the genus *Lecanora*, which include the Cudbere and Parell of dyers. [PARELLA.] The character of the genus *Roccella* is as follows:—Thallus coriaceo-cartillaginous rounded or plane, branched or lacineated; apothecia orbicular, adgate with the thallus; the disc coloured, plano-convex, with a border at length thickened and elevated, formed of the thallus, and covering a sublentiform black compact pulverulent powder, concealed from within the substance of the thallus.—*Eng. Cyc.*

Various lichens, and *Roccella tinctoria*, from Tenasserim and other parts of India, have been introduced into Britain by the East India Company. In the Admiralty instructions given to Capt. Sir James C. Ross, on his Antarctic voyage, a few years ago, his attention was specially called to the earch and enquiry for substitutes for the *Roccella*, which is now becoming scarce. A prize medal was awarded, in 1851, to an exhibitor from the Elbe or specimens of the weed, and an extract of red nd violet orchil. Specimens of varieties of the ichens used in the manufacture of cudbear orchil nd litmus, and of the substance obtained, were lso shown in the British department, for which were awarded prize medals.—*Simmonds.*

(7173) **ROCCELLA FUCIFORMIS**, the Flat-Leaved Orchil. Thallus flat, branched, early upright grayish-white, bearing powdery warts; apothecia horny, bordered. Both kinds re found on maritime rocks, or on dry stone walls exposed to the influence of the sea-breeze, s well on the coast of England as on the shores f the Mediterranean and the East Indies. The more arid the situation, the better is the quality f the lichens. The presence of the colouring matter is ascertained by steeping the weed broken up in small pieces in diluted solution of ammonia, in a bottle half filled with liquid, which hould be kept corked, but frequently opened in temperature not exceeding 150° Fahr.

(7174) **ROCCELLA TINCTORIA.** Dyer's Roccella, or Orchil. Thallus suffruticose, rounded, branched, somewhat erect, grayish-brown, bearing powdery warts; apothecia flat and horny, with a scarcely prominent border. A practical writer describes "the good kind as having a mealy white powder on its surface towards the centre; the under surface is of a gray colour; and is not hairy; if wetted, it does not turn of an orange colour: its edges are flat and thin."

(7175) **ROCK OIL.** PETROLEUM. The following account of the collection of Petroleum in the Island of Cheduba is given by Captain Halstead. Petroleum is found on the Island and might be extensively produced. Two wells sufficiently near each other to afford the conclusion of their possessing one common source, exist in the Kraerore circle, yielding annually about 60 pots each. A third is found in the "Mromee" circle; but it has been destroyed by fire and yields nothing, being the property, at present, of no one in particular, the soil around it, is however, full of the oil. The fourth and most extensive is in the Frangroa circle and yields near 200 pots in the year. The method of collecting it is simple: the earth is turned up to a depth of two feet, and a bank of soil raised round a square of about 20 yards, is distributed so as to form it during the rains into a shallow pond of about the above depth. The surface of this pond is in a constant state of ebullition from the escape of gas with which comes up the Petroleum. It collects on the surface in three different forms; a geen fluid oil first spreads itself over the spot where the gas is bubbling up. As it extends, its edges exhibit a brown curdled substance resembling half congealed dripping, and amongst this, as it becomes thicker is seen gathering in spots a dark brown substance of the color and consistency of molasses. This latter is used to preserve wood, to saturate paper for umbrellas, and is sometimes burned. But the fluid of a green color, is that mostly used to supply lamps. The curdled substance is used with the dark in the coarser purposes to which it is applied. This is the least valuable and sells at 5 pots for a rupee. The other two at 3 pots for 2 rupees. A bamboo is used to skim the surface of the ponds, and bring the substance to the bank, it is scooped up with a cocoanut shell and put into the pot. It floats so lightly on the water that this process is quickly and effectually performed. The break of the day is the time chosen for the operation as from the cooler temperature, it is then of harder consistence on the water and easier and cleaner skimmed. In the heat of the day it becomes so fluid as to make it difficult to collect without a large proportion of the water. In the months of March and April the pond gradually dries up, and the oil can then be no longer collected from out the soil. The pond is then dug, and the whole soil in it as much disturbed as possible; on this operation depends the quantity to be yielded during the next season, and the deeper it is dug, the larger will be the produce; while on the other hand, if it be neglected, which is most commonly the case, the quantity of oil to be collected will be very materially diminished. A sort of superstitious fear is attached to these ponds, and on no account would a native dip his foot in its water, though he will not hesitate to dig the soil when dry, nor to handle its produce, to which no sort of deleterious property is attributed. The state of ebullition without apparent heat may occasion this feeling among them. The ponds are surrounded by a rough hedge of stout sticks, to preserve them from the intrusion of buffaloe or deer. Insects were seen in them. I had no means of collecting any of the escaping gas, which I should otherwise have done, but no heat perceptable at the surface is employed for its extensive development, the thermometer where the greatest ebullition was going forward showing but two degrees more than the atmosphere viz., 74. No doubt this mineral product might with ease, and little expense, be increased to a very large amount, and the oil has yet perhaps to be better known and better appreciated than now when its value will in all probability be much increased. —*Rohde, M.S.S.* See ASPHALTE. NAPHTHA; and PETROLEUM.

(7176) **RODENTIA**, an order of Animals belonging to the class *Mammalia*, embracing the Rats and Mice, Hares, Rabbits, Guinea-Pigs, and other well-known animals. The following is Mr. Waterhouse's arrangement of these animals :—

		Europe and North Asia.	North America.	Africa.	India and Islands	South America and West India Islands
MURINA.	SCIURIDÆ............	5. Sciurus. 1. Pteromys. 1. Tamias. 3. Spermophilus. 2. Arctomys.	20. Sciurus. 3 Pteromys. 5, Tamias. 10. Spermophilus 8. Arctomys, 1, Aplodontia.	5. Sciurus. 3 Xerus.	25. Sciurus. 9. Pteromys.	6. Sciurus.
	MURIDÆ	3. Myoxus. 8. Dipus. 1 . Mus. 6. Cricetus.	2. Meriones. 6. {Mus. Hesperomys 1 Sigmodon. 2. Neotoma.	2. Graphiurus. 3. Myoxus. 4. Dipus. 10. Mus. 2. Dendromys. 6. Gerbillus. 1 Psammomys. 3. Euryotis.	12. Mus. 2. Gerbillus 1 Phlœomys. 2. Rhizomys.	30. {Mus. Hesperomys. 3. Reithrodon.
	ARVICOLIDÆ	1. Castor. 20. Arvicola. 4. Lemmus. 2 Spalax.	1. Castor. 1. Ondatra. 8. Arvicola. 4, Lemmus. 10. Geomys.			
HYSTRICINA.	HYSTRICIDÆ......	1 Hystrix.	1. Erethison.	1. Hystrix.	1. Hystrix. 1. Atherura.	3. Cercolabes. 2. Synetheres.
				1. Aulacodus, 1. Orycterus. 4. Bathyergus. 1. Petromys.		3. Capromys. 1. Myopotamus. 10. Echimys 6. Nelomys. 1. Cercomys. 2. Dasyprocta. 1. Cœlogenys.
	OCTODONTIDÆ... ...	....	....	....	....	2. Ctenomys. 1. Pœphagomys. 1. Octodon. 2. Abrocoma.
	CHINCHILLIDÆ ...	....	....	....	....	1. Chinchilla 2. Lagotis. 1. Lagostomus.
	CAVIIDÆ .:	....	....	....	....	6. Cavia. 2. Kerodon. 1. Dolicholis. 1. Hydrochœrus.
LEPORINA	LEPORIDÆ.	5. Lepus. 3. Lagomys.	15. Lepus. 1. Lagomys.	6. Lepus.	4. Lepus. 1, Lagomys.	1. Lepus.
		81 species. 16 genera.	99 species. 19 genera.	53 species. 16 genera.	58 species. 10 genera.	89 species. 25 genera

These animals have two great incisor teeth in each jaw, separated from the molars by a wide space, with which they could hardly seize a living prey, or rent flesh; they could not even cut aliments, but they might serve for reducing them by continued labour into fine molecules—in a word, for gnawing them; whence the term Rodents, or Gnawers, applied to this or der. With these weapons they attack the hardest vegetable productions, and frequently feed on wood and bark.

The form of the body of the Rodents is in general such that their hinder parts exceed their anterior ones, so that they leap rather than walk; this disposition in some of them is as excessive as in the Kangaroos.—*Eng. Cyc.*

(7177) ROE : *Fish roes, Red Fish*, and *Sardines*, are Malay condiments and the species used in the preparation, are *Atausa toli*, (*Ikan truboh*,) *Engraulis Brownii*, (*Bunga ayer or badah*,) *Dussumieria acuta* (*Tamban-bulat*) and *Clupeonia perforata*, (*Tamban-nepes or batub*)--*Cantor*.

(7178) ROHEPITTA, the gall of fishes.

(7179) ROHUN BARK. ROHUN-KE-CHILKEE. Rohunæ Cortex. Bark of Soymida febrifuga, is not spotted with rusty patches, and the inside is dark reddish brown, nitric acid does not stain it of a bright scarlet. These tests distinguish it from the poisonous bark of the nux vomica tree (Kuchila,) which is commonly sold for it in the bazars of Bengal.—*Beng. Phar.*

(7180) RONDELETIA, a genus of Plants belonging to the natural order *Rubiaceæ*, named after Rondelet, a French botanist of the 16th century. It is characterised by having a calyx with a subglobular tube. Corolla superior, funnel-shaped, ventricose at the throat; segments 4-5, ovate-obtuse, spreading; anthers 4-5, sessile within the corolla; ovary-2-celled; style filiform; stigma bifid; capsule round, crowned with the limb of the calyx. Seeds minute, numerous, or few when abortive. The genus, as formerly constituted, included many shrubby trees which occur in India (Roxb., 'Fl. Indica'), but these have been referred by modern botanists to *Adenosacme*, *Greenia*, and *Wendlandia*. The present genus *Rondeletia* occurs chiefly in America and the West Indies.—*Eng. Cyc.*

(7181) RONDELETIA TINCTORIA.

Tomayoke, BURM.; Tooralodh, HIND.

Small timber, adapted, from the fineness of he grain and elegance of colour, for ornamental work: wood dark-brown.—*McClelland.* The ree grows also in the Kotah and Mewar jungles he bark is used in dyeing red.—*Genl. Med. Top.* p. 182.

(7182) ROOSA OIL: GRASS OIL, ANDROPOGON CALAMUS AROMATICUS.

Roosa Teil, GUZ. HIND.

A valuable oil, obtained from a grass a native of the low hills at the base of the Himalayas; also found at Asseerghur, Malwa, nd Guzerat. It is chiefly imported into Bombay from Surat, and is re-exported in onsiderable quantities to England, China, and he Arabian and Persian Gulfs. It is highly steemed by the natives of India as a cure for heumatism, colds, and as an internal stimulant. *Faulkner.* This oil differs but little either in appearance or quality from the Lemon Grass Oil and is used for the same purposes. Roosa grass oil, the produce of "*Andropogon Calamus aromaticus*" was exhibited from the Nizam's territories by Dr. Riddell at the Madras Exhibition of 1855, but is found to be a good substitute for the more expensive Cajeput oil, and is a useful rubefacient. —*M. E. J. R.*

(7183) ROPE.

Doodah, GUZ.; Russee, HIND.

Consists of hemp, coir, cotton, straw, and other fibrous materials, spun into thick yarn, of which several strings are twisted together by means of a wheel. All the different kinds of this manufacture, from a fishing line or whip-cord, to a cable, go by the general name of cordage.—*Faulkner.* There is not in Southern Asia any large Rope walk, but for the materials for Rope making we refer to the articles FIBRES: CORDAGE.

(7184) ROSE ATTAR AND ROSE WATER. In India the perfumed oils are obtained in the following manner: The layers of the jasmine, or other flowers, four inches thick and two inches square, are laid on the ground and covered with layers of sesamum or any other oil yielding seed. These are laid about the same thickness as the flowers, over which a second layer of flowers like the first is placed. The seed is wetted with water, and the whole mass covered with a sheet, held down at the end and sides by weights, and allowed to remain for eighteen hours in this form. It is now fit for the mill, unless the perfume is desired to be very strong, when the faded flowers are removed and fresh ones put in their place. The seed thus impregnated is ground in the usual way in the mill and the oil expressed, having the scent of the flower. At Ghazipoor the jasmine and bela are chiefly employed; the oil is kept in the dubbers, and sold for about 4s. a seer. The newest oils afford the finest perfume. In Europe a fixed oil, usually that of the bean or moringa nut, is employed. Cotton is soaked in this, and laid over layers of flowers, the oil being squeezed out so soon as impregnated with perfume. Dr. Jackson thus describes the culture and manufacture:—

(7185) *Roses, Cultivation of*,—Around the station of Ghazipoor, there are about 300 biggahs (or about 150 acres) of ground laid out in small detached fields as rose gardens, most carefully protected on all sides by high mud walls and prickly pear fences, to keep out the cattle. These lands, which belong to Zemindars, are planted with rose trees, and are annually let out at so much per biggah for the ground, and so much additional for the rose plants—generally five rupees per biggah and twenty-five rupees for the rose trees, of which there are 1,000 in each biggah. The additional expense for cultivation would be about eight Rupees eight annas; so that for thirty-eight rupees eight annas you have for the season one biggah of 1,000 rose trees. If the season be good, this biggah of 1,000 rose trees should yield one lac of roses. Purchases for roses are always made at so much per lac. The price of course varies according to the year, and will average from 40 to 70 rupees.

Manufacture of rose-water.—The rose trees come into flower at the beginning of March, and continue so through April. Early in the morning the flowers are plucked by numbers of men, women, and children, and are conveyed in large bags to the several contracting parties for distillation. The cultivators themselves very rarely manufacture. The native apparatus for distilling the rose-water is of the simplest construction; it consists of a large copper or iron boiler well tinned, capable of holding from eight to twelve gallons, having a large body with a rather narrow neck, and a mouth about eight inches in diameter; on the top of this is fixed an old degh-chee, or cooking vessel, with a hole in the centre to receive the tube or worm. This tube is composed of two pieces of bamboo, fastened at an acute angle, and it is covered the whole length with a strong binding of corded string, over which is a luting of earth to prevent the vapour from escaping. The small end, about two feet long, is fixed into the hole in the centre of the head, where it is well luted with flower and water. The lower arm or end of the tube is carried down into a long-necked vessel or receiver, called a bhulka. This is placed in a pot of water, which, as it gets hot, is changed The head of the still is luted on to the body, and the long arm of the tube in the bhulka is also well provided with a cushion of cloth, so as to keep in all vapour. The boiler is let into an earthen furnace, and the whole is ready for operation. There is such a variety of rose-water manufactured in the bazar, and so much that bears the name, which is nothing more than a mixture of sandal oil, that it is impossible to lay down the plan which is adopted. The best rose-water, however, in the bazar, may be computed as bearing the proportion of one thousand roses to a seer of water; this, perhaps, may be considered as the best procurable. From one thousand roses most generally a seer and a half of rose-water is distilled, and perhaps from this even the attar has been removed. The boiler of the still will hold from eight to twelve or sixteen thousand roses. On eight thousand roses from ten to eleven seers of water will be placed, and eight seers of rose-water will be distilled. This after distillation is placed in a carboy of glass, and is exposed to the sun for several days to become pucka (ripe); it is then stopped with cotton, and has a covering of moist clay put over it: this becoming hard, effectually prevents the scent from escaping. The price of this will be from twelve to sixteen rupees. This is the best that can be procured.

(7186) *Roses, Attar of*.—To procure the attar, the roses are put into the still, and the water passes over gradually, as in the case of the rose-water process; after the whole has come over, the rose-water is placed in a large metal basin, which is covered with wetted muslin, tied over to prevent insects or dust getting into it; this vessel is let into the ground about two feet, which has been previously wetted with water, and it is allowed to remain quiet during the whole night. The attar is always made at the beginning of the season, when the nights are cool; in the morning the little film of attar which is formed upon the surface of the rose-water during the night is removed by means of a feather, and it is then carefully placed in a small phial; and, day after day, as the collection is made, it is placed for a short period in the sun, and after a sufficient quantity has been procured, it is poured off clear, and of the colo of amber, into small phials. Pure attar, when it has been removed only three or four days, has a pale greenish hue; by keeping it loses this, and in a few weeks' time it becomes of a pale yellow. The first few days distillation does not produce such fine attar as comes off afterwards in consequence of the dust or little particles o dirt in the still and the tube being mixed with it. This is readily separated, from its sinking to the bottom of the attar, which melts at a temperatur of 84 degrees. From one lac of roses it i generally calculated that 180 grains, or one tolah of attar can be procured; more than this can b obtained if the roses are full-sized, and the night cold to allow of the congelation. The attar pur chased in the bazar is generally adulterated mixed with sandal oil or sweet oil; not eve the richest native will give the price at which th purest attar alone can be obtained, and the pures attar that is made is sold only to Europeans During the past year it has been selling from 8 to 90 rupees the tolah; the year before it migh have been purchased for 50 rupees.

(7187) *General Remarks*. Native stills are le out at so much per day or week, and it frequent ly occurs that the residents prepare some rose water for their own use as a present to thei friends, to secure their being provided with tha which is the best. The natives never remov the calices of the rose-flowers, but place the whol into the still as it comes from the garden. Th best plan appears to be to have these remove as by this means the rose-water may be preserv ed a longer time, and is not spoiled by the aci smell occasionally met with in the native ros water. It is usual to calculate 100 bottle to one lac of roses. The rose-water shoul always be twice distilled: over ten thousan roses water may be put to allow of sixteen c twenty bottles coming out; the following da these twenty bottles are placed over eight thou sand more roses, and about eighteen bottles of rose-water are distilled. This may be considered the best to be met with. The attar is so much lighter than the rose-water, that, previous to use, it is better to expose the rose-water to the sun for a few days, to allow of its being well mixed; and rose-water that has been kept six months is always better than that which has recently been made. At the commencement of the rose season, people from all parts come to make their purchases, and very large quantities are prepared and sold. There are about thirty-six places in the city of Ghazeepore where rose-water is distilled. These people generally put a large quantity of sandal oil into the receiver, the oil is afterwards carefully removed and sold as sandal attar, and the water put into carboys and disposed of as rose-water. At the time of sale a few drops of sandal oil are placed on the neck of the carboy to give it fresh scent, and to many of the natives it appears perfectly immaterial whether the scent arises solely from the sandal oil or from the roses. Large quantities of sandal oil are every year brought up from the south and expended in this way.

The chief use the natives appear to make of the rose water, or the sandal attar as they term it, is at the period of their festivals and weddings. It is then distributed largely to the guests as they arrive, and sprinkled with profusion in the apartments. A large quantity of rose water is sold at Benares, and many of the native Rajahs send over to Ghazipoor for its purchase. Most of the rose water, as soon as distilled, is taken away, and after six months from the termination of the manufacture there are not more than four or five places where it is to be met with. I should consider that the value of the roses sold for the manufacture of rose water may be estimated at 15,000 to 20,000 rupees a year; and from the usual price asked for the rose water, and for which it is sold, I should consider there is a profit of 40,000 rupees. The natives are very fond of using the rose water as medicine, or as a vehicle for other mixtures, and they consume a good deal of the petals for the conserve of roses, or gooleond as they call it.—*O'Shaughnessy, p.* 326. In addition to the above, we observe the following in Simmonds. The roses of Ghazipoor on the river Ganges, are cultivated in enormous fields of hundreds of acres. The delightful odor from these fields can be scented at seven miles distance on the river. The valuable article of commerce known as attar of roses is made here in the following manner:—On 40 pounds of roses are poured 60 pounds of water, and they are then distilled over a slow fire, and 30 pounds of rose water obtained. This rose water is then poured over 40 pounds of fresh roses, and from that is distilled at most 20 pounds of rose water; this is then exposed to the cold night air, and in the morning a small quantity of oil is found on the surface. From 80 pounds of roses, about 200,000, at the utmost an ounce and a-half of oil is obtained; and even at Ghazipoor it costs 40 rupees (4*l.*) an ounce. Five guineas have been often paid for one ounce of attar of roses. The most approved mode of ascertaining its quality is to drop it on a piece of paper; its strength is ascertained by the quickness with which it evaporates, and its worth by its leaving no stains on the paper. The best otto is manufactured at Constantinople.—*Simmonds.*

(7188) ROSA: *Species.* CHINA YELLOW ROSE. On this and another rose, Fortune says, the gardens of the mandarins were extremely gay, particularly during the early months of the year; and, what was of more importance to me, contained a number of new plants of great beauty and interest. On entering one of the gardens on a fine morning in May, I was struck with a mass of yellow flowers which completely covered a distant part of the wall. The colour was not a common yellow, but had something of buff in it which gave the flowers a striking and uncommon appearance. I immediately ran up to the place and, to my surprise and delight, found that it was a most beautiful new double yellow climbing rose. I have no doubt, from what I afterwards learned, that this rose is from the more northern districts of the empire, and will prove perfectly hardy in Europe. Another rose, which the Chinese call the "five coloured" was also found in one of these gardens at this time. It belongs to the section commonly called China roses in Great Britain, but grows in a very strange and beautiful manner. Sometimes it produces self colored blooms being either red or French white and frequently having flowers of both on one plant at the same time while at other times the flowers are striped with the two colours. This will also be as hardy as our common China Rose. Glycine sinensis is often grown on a flat trellis in front of the summer house or forms a kind of portico, which affords a pleasing shade. Entwined with one of these trees, I found another variety, having very long racemes of pure white flowers, which contrasted well with the light blue of the other. I obtained permission from the old Chinese gentleman to whom it belonged (my old friend Dr. Chang) to make some layers of this fine plant, and I am happy to say that one of these is now alive in the garden at Chiswick.—*Fortune's Wanderings, page* 311.

(7189) ROSE. ROSA.

Wurd, ARAB.
Gul, BENG.
Hoa-houng-tau, COCH-CHIN.
Mei-kwe hwa, CHIN.
Rose a cent feuilles, FR.
Blassen-rose, GER.
Gul, GUZ.
Gul. Gul-ab-ka-phool, H.
Rosa, IT.
Mawar, MAL.
Gul, PERS.
Gulaba-poo, TAM.

Rosa (from the Latin *Rosa*, through the medium of the French Rose; the Latin *Rosa* and the Greek Ῥόδον are evidently the same) the name of the most universally admired and cultivated genus of plants, forming the type of the natural order *Rosaceæ*. The Rose was known in early times, and was as great a favourite among the nations of antiquity as it is in modern times. The Rose is found generally in almost every country of the northern hemisphere, both in the Old and New World; from Sweden to the north of Africa; from Kamtchatka to Bengal, and from Hudson's Bay to the mountains of Mexico. It is not found in South America or in Australia. All the species are included between 70° & 19° N. lat. It is found more generally on dry and free soils than on those which are wet and tenacious. In the north of Europe it occurs with single flowers, but in Italy, Greece, and Spain more frequently double. The characters of the genus *Rosa* are—calyx 5-parted, tube fleshy, urceolate; petals five; stamens numerous, attached to the calyx and corolla; ovaries attached to the inner surface of the tube of the calyx; style long, stigma projecting beyond the mouth of the calyx; achenia numerous, hard. The species are mostly shrubs with alternate pinnate leaves and beautiful odoriferous flowers. There are few better marked genera amongst plants than this, but as of all plants it has been the greatest favourite, and thus surrounded by the greatest variety of external influences, its species and varieties are the most difficult to distinguish.—*Eng. Cyc.* Regarding the cultivation, in India, of this favorite plant, bearing such a variety of coloured flowers,—from the deep red to the pale yellow and white, with all their intermediate shades—we may point out that the easiest mode of propagation is by layers at almost all seasons, or by cuttings at the commencement of the rains. The Persian varieties, red and white, require to have their roots opened, and the plants cut during the early part of the cold season, after which they must be watered well every second or third day. The roots must then be covered up with manure, when they will throw out flowers, which are generally used for rose water. The Rose Edward, which blossoms great part of the year, requires pruning about a month after it ceases to blossom, and should be allowed to rest a short time without watering, when a fresh supply of water and manure round the roots will cause it to bear flowering shoots immediately. This rose, and the Egyptian, are amongst the few that give seed-hips being perfectly formed on both.—*Riddell.*

Dr. Lindley, in his 'Rosarum Monographia,' arranges the species under eleven divisions, the first of which, including but one species, has since been made into the genus *Lowea*. We shall here give the remaining divisions, and point out the species which, on account of their ornamental flowers or uses, are most frequently cultivated.

1. *Feroces*, with branches permanently tomentose and naked fruit. They are generally low shrubs, remarkable for thick hoary branches clothed with numerous prickles, and hence their name. There are only three species belonging to this division, of which *Rosa ferox*, the Hedgehog-Rose, is most common.

2. *Bracteatæ*.—The species of this division have not only their branches, but also their fruit clothed with a persistent tomentum. They have mostly bright-green leaves, and their organs of fructification are in the highest state of development of any of the genus. They belong to the class of evergreen roses. *R. bracteata*, the Macartney Rose, is a native of China, and was introduced into Great Britain by Lord Macartney. It has upright branches, 5-9-leaflets, stout prickles, with large white terminal solitary flowers, and large globose orange red fruit. It is a handsome plant, flowering abundantly late in the season. *R. microphylla.* Small-Leaved Rose, resembles *R. bracteata*, but differs in being smaller, and having prickly fruit and ovate-obtuse leaves.

3. *Cinnamomeæ*, distinguished by their long lanceolate leaflets, without glands, bracteated flowers, and delicate but little thickened. The shoots are either with or without setæ. There are several species in this division, but comparatively few are known out of the herbarium. *R. lucida*, the Bright-Leaved Rose; *R. laxa*, Loose or Spreading Carolina Rose; and *R. Carolina*, the True Carolina Rose, belong to this division.

4. *Pimpinellifoliæ*.—Branches either crowded with nearly equal prickles or unarmed; leaflets ovate or oblong: bracts absent; sepals connivent and persistent. Although this division approaches the last in artificial characters; it is essentially different in habit. *R. spinosissima*, the Scotch Rose, is a dwarf, compact, green bush, with creeping roots; it has unequal prickles, flat, glabrous, simple serrated leaflets, and small, solitary, white, or bluish-coloured flowers. It is found native in the mountainous districts and sea-coasts of all Europe, and also in the Caucasus. It was the only rose found by Sir W. Hooker in Iceland. A great number of varieties are found in the gardens of Britain, produced from the wild plant found in the North of England and Scotland. *R. sulphurea*, the Double-Yellow Rose, and *R. alpina*, the Boursalt Rose, are also examples.

5. *Centifoliæ*, clothed with bristles and prickles; flowers bracteate; leaflets oblong or ovate, rugous, disc thickened, closing the throat; sepals compound. This division comprehends those species which have ever been most interesting to the florist, as also probably those that were earliest known. Although the garden varieties of this division would probably amount to several hundred, there are only three species.—*Eng. Cyc.*

(7190) ROSA CANINA, the Dog-Rose, is one of the most common species of the division in this country, and from its varying characters has given origin to a great number of names supposed to represent species. This is the species used for making conserve of roses.

9. *Systylæ.*—Styles cohering in an elongated column; stipules adnate. The habit of the plants of this division is nearly the same as that of the last. *R. arvensis*, the Field or White Dog-Rose, belongs to this group. It is a very common plant in many parts of England, adorning the hedges with its elegant snowy blossoms. It has cord-like shoots, unequal falcated prickles, leaflets glaucous beneath; diverging stipules, and ovate crimson fruit. The varieties of this and allied species, as *R. multiflora* and *R. sempervirens*, produce the climbing roses of the garden, of which there a great number now to be had.

(7191) ROSA CENTIFOLIA. (HUNDRED-LEAVED ROSE.)

Goolab Sudburg, PERS. | Wurd, ARAB.

A native of Syria, cultivated in Europe. The odour of this species is but partially destroyed by desiccation, and according to M. Chereau is remarkably augmented by iodine. It is less astringent than the Provence rose, and more laxative. It furnishes essential oil in small quantities, and is much employed for distillation of rose water, and in the preparation of the essential oil, or *Utr*. The petals of this as well as of the R. gallica are preserved with salt by the European apothecaries for the preparation of the distilled water.—*O'Shaughnessy.* *R. centifolia*, the Hundred-Leaved Cabbage, or Provence Rose, is known by its large unequal prickles, glandulous leaflets, pendulous flowers, and oblong fruit. This rose has been said to be a native of France, but this is doubtful. It has been found wild in thickets on the eastern side of the Caucasus. It is the same plant as the *R. provincialis* of Miller. A botanical variety of this species, the *R. centifolia muscosa*, is the parent of the beautiful family of moss-roses.—*Eng. Cyc.*

(7192) ROSA DAMASCENA, the Damask Rose, has unequal prickles; the larger ones falcate, sepals reflexed, fruit elongated. This plant is supposed to have been originally brought from Damascus, and to be a native of Syria. It is much cultivated in gardens, and has not fewer varieties than the two last.

6. *Villosæ.*—Root-shoots erect; prickles nearly straight; leaflets ovate or oblong, with diverging serratures, sepals persistent, connivent; disc thickened, closing the fauces. The best known species of this division is the *R. alba*, White Rose; it has rugose glaucous leaves, with simple serratures and acicular unequal prickles, by which it may be distinguished from both R. *tomentosa* and *R. canina*, with which it is liable to be confounded. It is a native of Piedmont, Cochin-China, Denmark, France, and Saxony. Its flowers are very large, exhaling a delicious fragrance. *R. Hibernica*, the Irish Rose, belongs to this division, and is interesting to the botanists as being entirely confined to Ireland.

7. *Rubiginosæ.*—Unequal and sometimes bristly prickles, ovate or oblong leaflets, with glands and diverging serratures, persistent sepals, thickened disc, and arched root shoots. To this division belongs the *R. rubiginosæ*, Eglantine, or Sweet Briar. It is common in Britain in bushy places on a dry gravelly soil. *R. lutea*, the Austrian Briar, is nearly allied to the latter.

8. *Caninæ.*—With equal hooked prickles; oval eglandulose leaflets, with connivent serratures, deciduous sepals, and thickened disc closing the throat. To this division belong many of the varieties called Autumnal or Perpetual Roses, on account of their blooming late in the season and continuing in flower a long time. Of the roses in this group that have afforded varieties for the garden, the *R. Indica*, Chinese Rose, stands first. There is a hybrid variety between this species and the *R. odorata*, which is well known in gardens under the name of *R. Indica odorata*, Tea-Scented China Rose. This rose is the parent of a great number of sorts in gardens. The Bourbon Rose (*R. Bourboniana*) is a natural hybrid between *R. Indica* and a variety called Red Four-Seasons. This hybrid was found amongst a number of the latter plants in a hedge in the Isle of Bourbon. It was brought to Paris, and has since produced many beautiful varieties. The Noisette Rose was grown from seeds produced from *R. moschata* impregnated with *R. Indica*. It was first reared in America.

(7193) ROSA GALLICA (FRENCH, OR PROVENCE RED ROSE.)

Gul, HIND.

This is a native of Persia, the petals contain tannic and gallic acid, essential oil, oxide of iron, and other unimportant principles. The petals are gathered before becoming quite ripe, they are deprived of the calyx and central attachments, and dried before the sun or in a stove. When dried they are sifted in order to separate the stamina and pistil. They are then gently compressed and kept in a dry place. From a variety of this species, the cabbage rose, a very fragrant distilled water is prepared in England. —*O'Shaughnessy, page* 326. *R. Gallica*, the French Rose, has equal small prickles, erect flowers, ovate sepals, and globose fruit. It is found wild about Montalbanum, Walzenberg, and Geneva, also in Austria, Piedmont, and the Caucasus. This is supposed to be the species to which Pliny refers ('Hist. Nat.,' xxi. 18, 25, 72. 73). *R. pumila* of Jacquin is a variety of this species. Hundreds of varieties of this rose are found cultivated in gardens. A great number of varieties of roses found in gardens are hybrids between *R. Gallica* and *R. centifolia*. They mostly combine the long graceful shoots of the last with the rich crimson hues of the first. Hybrids are also produced between *R. Gallica* and *R. Indica*, but differ from the last in not being perpetual. They have a pleasing glossy sub-evergreen foliage.—*Eng. Cyc.*

(7194) ROSA LAWRANCEANA, the Miniature or Lawrance Rose, named after Miss Lawrance, who published a collection of drawings of roses, belongs to this division. It was first brought from China, and is probably only a dwarf variety of *R. Indica* or *R. semperflorens*, which it closely resembles in structure.—*Eng. Cyc.*

(7195) ROSA MACROPHYLLA. The great red rose is one of the most beautiful Himalayan plants, whose single flowers are as large as the palm of the hand.—*Hooker Him. Jour. Vol.* II, *p.* 43.

(7196) ROSA MOSCHATA, the Musk-Rose, is one of the oldest inhabitants of our gardens. It is found native in the North of Africa, and in the temperate and warm provinces of Spain.

10. *Banksianæ.*—Nearly free subulate stipules, usually deciduous; ternate shining leaflets and climbing stems. This is the last division of the species of roses. The most remarkable species in this group is the *R. Banksiæ*, Banksian Rose, named after Lady Banks. It is a native of China, and has very numerous double sweet-scented nodding flowers, which are arranged in umbel-like corymbs. The roses are used in the arts for obtaining their delicious perfume, which is called Attar of Roses. The petals are also used in medicine.—*Eng. Cyc.*

(7197) ROSA RUBIGINOSA. SWEET-BRIAR. Native name, gul nusreen. This species of rose which was once scarce in the Deccan is now to be met with in many gardens—it sometimes blossoms, if budded on the Persian rose stock. The general mode of propagation is by layers, but a much quicker and easier method is to bud it on the stock of a rose.—*Riddell.* Tenasserim residences are often filled with sweet odours from the grateful eglantine, or sweet briar, but the plant is kept alive with difficulty when exposed to the southwest monsoon.—*Mason.*

(7198) ROSA SERICEA. Is an erect white flowered rose, and the only species occurring in Southern Sikkim. It is very abundant: its numerous inodorous flowers are pendent, apparent as a protection from the rain, and it is remarkable as being the only species having four petals, instead of five.—*Hooker, Him. Jour. Vol.* I, *p.* 168.

(7199) ROSACEÆ, a natural order of Polypetalous Exogenous Plants, with 4-5-lobed calyx; 4 or 5 regular petals; indefinite perigynous stamens; exalbuminous seed; and alternate stipulate leaves. The plants of this order are allied to *Chrysobalanaceæ*, from which they may be distinguished by their styles proceeding from the side of the ovarium near the apex, and not from the base, and by their regular petals and stamens. They are distinguished from *Fabacea* (*Leguminosæ*) by their regular petals and stamens, and especially by the odd segment of the calyx being posterior, and not anterior, and in that order. The genera of this order may be arranged under four groups or sub-orders, the principal distinctions of which will be seen in the following analysis:—

Carpels numerous.

Ovaries superior.	*Rosaceæ* (proper).
Ovaries inferior.	*Pomeæ.*

Carpels solitary.

Fruit a drupe.	*Amygdaleæ.*
Fruit a nut.	*Sanguisorbeæ.*

Rosaceæ proper, include the true Roses (*Roseæ*), the Cinquefoils(*Potentilleæ*), the Spiræas (*Spiræeæ*), and the Neuradas (*Neuradeæ*). They are herbaceous plants or shrubs. This family includes about 570 species and 20 genera, principally inhabitants of the temperate and cold zones of the northern hemisphere of the New and Old World; a very few are found on high land within the tropics, and a small number in the southern hemisphere. None of the plants of this section of the order are unwholesome; they are characterised by the presence of an astringent principle, which has led to the use of many of them in medicine, viz; ROSA; POTENTILLA; SPIRÆA; FRAGARIA; GEUM: DRYAS.—*Eng. Cyc.*

Pomeæ are known by the adhesion of their ovaries to the sides of the calyx, forming the fruit called a Pome. Their ovula are always in pairs. The tendency of the flowers of this family to revert to their normal state frequently affords instructive examples of morphological changes. The fruit of many of the species contains a considerable quantity of malic acid, which gives to the fruit its peculiar flavour. The Apple, Pear, Medlar, Quince, Service-Tree, and Mountain-Ash belong to this family. They are inhabitants of Europe, Northern Asia, the mountains of India, and North America. The genera are PYRUS; CYDONIA; AMELANCHIER; CRATÆGUS; COTONEASTER; MESPILUS.—*Eng. Cyc.*

Amygdaleæ have but a single carpel, which when ripe is a drupe, but they are also distinguished amongst *Rosaceæ* by their leaves containing hydrocyanic acid, and their bark yielding gum. They are natives exclusively of the northern hemisphere, where they are found in cold or temperate climates. Many of the species are poisonous, on account of the hydrocyanic acid they contain. They yield, however, some of our most valued fruits, as the Peach, Nectarine, Plum, Apricot, Cherry, and Almond, which last is the seed of the *Amygdalus communis.* The genera are AMYGDALEÆ; AMYGDALUS: PRUNUS.—*Eng. Cyc.*

Sanguisorbeæ are not only known by their solitary carpels but they are destitute of petals and have a hard thickened calyx. They are found wild in heaths, hedges, and exposed places in Europe, North and South America beyond the tropics, and the Cape of Good Hope. Their principal property is astringency, and some of the species may be used as fodder. The genera are Sanguisorba; Poterium; Agrimonia.—*Eng. Cyc.*

(7200) ROSCOEA, a genus of Plants belonging to the natural order *Scitamineæ* or *Zingiberaceæ*, which was named by Sir J. E. Smith, in honour of the historian of the Medici, who elucidated the plants and remodelled the genera of the *Scitamineæ* in his beautiful work on that family. The species have been figured by Smith, Wallich, and Royle. The genus consists of only a few species, which are confined to the Himalaya Mountains, and is characterised by having spathaceous flowers, a single-leafed tubular calyx, corolla ringent, limb double, the outer tripartite, with the upper segment erect and arched. Inner limb two-lipped, ovary inferior, style inclosed in the furrow of the anther, which is two-lobed, incurved, surrounding the style with an appendage split at the base. The species of *Roscoea*, belonging to so tropical a family as the *Scitamineæ*, are generally accounted showy stove plants; but they are found only on the slopes of the Himalayas during the rainy seasons, when there is moisture with uniformity of temperature. *R. alpina* is found at as great an elevation as 9000 feet above the level of the sea, and on places whence the snow had just melted, like the snowdrop in early spring in European countries. —*Eng. Cyc.* Wight gives Roscoea alpina, 2013; lutea, 2013·2.

(7201) ROSELLE. HIBISCUS SABDARIFFA.

Yerra googoo. TEL.
Kaserica, HIND.
Poolchay keeray, TAM.

The roselle plant, the red sorrel of the West ndies, is very widely diffused and its red sour alyx makes a fine flavored jelly, and preserve, vhich is a good substitute for cranberries.—*Faulkner.* This plant grows readily all over India, nd is cultivated in most gardens, because its ipe, fleshy calyxes, have a pleasantly acid taste, nd make excellent tarts and jelly: and in the Vest Indies, refreshing drinks. The stems cut vhen in flower, and the bark stripped off, and teeped immediately, a mass of fibres is display- d, the minute fibres of which are of a fine silky aturc.

(7202) ROSE MALOES: ROSA MALLOS: IQUID STORAX. LIQUIDAMBER ALTINGAA? his is a thick scented gummous oil of the con- stenee of tar; it is brought from Persia via In- a to China; and when good has a pearly appear- nce. The price has declined much of late years; used to sell for $ 30 per pecul.—*Morrison.* It used for medicinal purposes.—*Williams' Mid- e Kingdom, Vol.* II. *page* 406.

(7203) ROSE WATER.

ul-ab-ka-panee, GUZ HIND.
Ab-i-gul. PERS.

The water distilled from roses, and put into rboys (large glass bottles of about three Im- erial gallons capacity each) for sale. A large quantity is annually exported from the Persian Gulf to Bombay; that sold in Benares is obtained from Gazeepore, where it is largely distilled. Rose water is much esteemed on account of its great fragrance,and is chiefly used by the natives at the periods of their festivals and weddings.

(7204) ROSE WOOD.

Bois du rose, FR.
Rosen-holz, GER.
Legno rodie, IT.
Pao de rosada, POR.
Leno de rosa, SP.
Yerra goodda-chava curra, TEL.

Like to Iron-wood; Blackwood &c., this is a term given to the timber of several trees. One is a beautiful fancy wood, produced by a large tree found in Brazil, the Canary Islands; in Siam, whence it is largely exported by the Chinese; and other places. It is of a reddish colour, has an agreeable odour, and is esteemed according to the degree in which the darker parts are distinct from the purple red, which forms the ground. It is used for cabinet-work, either whole or cut into veneer.—*Faulkner.*

Another Rose-wood is the *Lignum Rhodium*, or *Aspalathus*, (whence the Oleum Rhodii is obtained). It is heavy, oleaginous, somewhat sharp and bitter to the taste of a strong smell, and purple colour.

The *Chinese Rose-wood*, called by the natives Tze-tau, is odorous, of a reddish black colour, streaked, and full of fine veins, which appear to be painted. The manufactures of this wood are more valued in China than the varnished or japanned. There are baser kinds of Rose-wood of inferior value.—*Morrison.*

East Indian Blackwood or Rosewood, is an excellent heavy wood, suited for the best furniture. It can be procured in large quantities, and of considerable size; the wood contains much oil, which was exhibited in Cl. IV (by the Ganjam Local Committee). In large panels it is liable to split.—*M. E. J. R.*

Rosewood, used in Britain, is produced in the Brazils, the Canary Isles, the East Indies, and Africa. It is imported in very large slabs,or the halves of trees that average 18 inches wide. The best is from Rio de Janeiro, the second quality from Bahia, and the commonest from the East Indies: the latter is called EastIndiaBlack-wood, although it happens to be the lightest and most red of the three; it is devoid of the powerful smell of the true rose-wood, which latter Dr. Lindley considers to be a species of Mimosa. The pores of the East India Rose-wood appear to contain less or none of the resinous matter, in which the odour like that of the flower Acacia armata, arises. Rose-wood contains so much gum and oil, that small splinters make excellent matches. The colours of rose-wood are from light hazel to deep purple, or nearly black: the tints are sometimes abruptly contrasted at other times striped or nearly uniform. The wood is very heavy; some specimens are close and fine in the grain, whereas others are as open as coarse mahogany, or rather are more abundant in veins: the black streaks are sometimes particularly hard, and very destructive to the tools.

Next to mahogany, it is the most abundant of the furniture woods; a large quantity is cut into veneers for upholstery and cabinet work, and solid pieces are used for the same purposes, and for a great variety of turned articles of ordinary consumption.—*Tredgold.*

(7205) ROSES, OTTO OF.

Uttur, Guz. | Uttur-i-Gul, Pers.
Gulab-ka-Uttur. Hind. |

This far-famed, highly valuable, and delightful perfume, is prepared in Persia, Upper Egypt, Tunis, Cashmere, and Ghazipore in Bengal. It is estimated that one hundred thousand roses, yield 180 grains or one tola of the Uttur. The otto of roses purchased in the bazars is generally adulterated with sandalwood and sweet oil; the genuine article being only procurable at a high price.—*Faulkner.* See Rose Attar.

(7206) ROSETTA-WOOD, is a good sized, East India wood, imported in logs 9 to 14 in diameter; it is handsomely veined; the general colour is a lively red-orange, (like the skin of the Malta orange,) with darker marks, which are sometimes nearly black; the wood is close, hard, and very beautiful when first cut, but soon gets darker.—*Holtz.*

(7207) ROSIN.

Rall, Guz. Hind.

A commercial name for the residium of the distillation of turpentine: it is light, hard, brittle, inflammable, transparent, dark, coloured substance. Several kinds are distinguished, as black or common, amber rosin, &c. It is used in the manufacture of soap, varnishes, and for other purposes.—*Faulkner.* See Resin and Dammer.

(7208) ROSMARINUS, a genus of Plants belonging to the natural order *Lamiaceæ.* The genera belonging to this order are perennial and possess the character of shrubs.—*Eng. Cyc.*

(7209) ROSMARINUS OFFICINALIS.

Rosemary, Europe, Asia Minor.
Ukleel ul jibbal, Hind. | Hasalban aeksir, Arab.

Rosmarinus officinalis, the Common Rosemary, is an inhabitant of the southern parts of France, Spain, and Italy, the basin of the Mediterranean, and some parts of Asia Minor. —*Eng. Cyc.* The essential ingredient in the well known *Eau de la reine d' Hongrie* is the essential oil of this plant. It is a shrub three to four feet high, densely leafy. The oil is stated most positively to possess the power of encouraging the growth of hair and of curing baldness. It is the colouring ingredient of green pomatums. —*O'Shaughnessy, page* 488.

(7210) ROTHIA TRIFOLIATA.

Nurrey-pithen-keeray, Tam.

A small procumbent weed, with trifoliate leaves, used by the natives as greens, abundant every where.—*Jaffrey.*

(7211) ROTIFERA, Wheel-Animalcules, a class of animals placed by Ehrenberg among the *Infusoria*, under the name of *Rotatoria.* They have acquired these names on account of the apparent rotation of the disc-like organs which surround their mouths and which are covered by cilia. These creatures are very minute, and although some of the larger forms may be detected by the naked eye, their organisation can only be seen by the aid of the microscope. We are indebted to Leeuwenhoek for the discovery of their existence and the first account of their structure and habits. In the 'Philosophical Transactions' for 1702, he gave an account of the discovery of what is now called *Rotifer vulgaris*, one of the most common forms of these animals. He afterwards described another form, *Melicerta ringens.* The *Rotifera* are very widely diffused on the surface of the earth. They inhabit both fresh-waters and the ocean, and are found in the cold, temperate, and tropical parts of the earth. Although capable of swimming freely they are generally found near or attached to the leaves of plants. They are found constantly present in ponds and streams in which *Ceratophyllum*, *Calliteriche*, *Valisneria*, and other fresh-water plants abound.

(7212) ROTTEN-STONE, a Mineral, occurring massive. Fracture uneven. Colour grayish, reddish, or blackish brown. Dull earthy and opaque. Soft, soils the fingers, and is fetid when rubbed or scraped. It is found near Bakewell, Derbyshire; and at Albany, in the state of New York. It is employed in polishing metals, &c. The analysis by R. Phillips gives—

Alumina	86
Silica	4
Carbonaceous matter . . .	10
Eng. Cyc.	—100

(7213) ROTTLERA, a genus of Plants named in honour of Dr. Rottler, belonging to the natural family *Euphorbiaceæ.* It is characterised by having male and female flowers upon different plants. Male: Calyx 3-5-partite; corolla none; stamens 30 to 40, inserted into the convex receptacle; filaments free or united at the base. Female: Ovary 2-3-4-celled, each 1-seeded; style deeply 2-3-4-partite, laciniated: capsule 2-3-4-coccous, each 1-seeded. The genus, which is found in the tropical parts of Asia and throughout India, contains handsome moderate-sized trees. *R. tetracocca* grows in Silhet, and yields a hard and valuable timber. The capsules of *R. tinctoria*, a native of the Coromandel coast, and extending to the forests of Northern India, are covered with short stiff hairs, which when rubbed off have the appearance of a powder of a fine red colour, which is employed in India in dyeing silk of a scarlet colour, and therefore forms an article of commerce in this country. Dr. Royle states that this strigose pubescence is also employed in India as an anthelmintic in the same way that cowage is and, like it, probably acts mechanically in expelling intestinal worms.—*Eng. Cyc.* Dr. Wight in Icones, gives Rottlera dioeca, 1915.; Indica, 1870-71; peltata, 1873-86; and tinctoria, 1915.

(7214) ROTTLERA TINCTORIA.

Cupela, also Poonag, also Tukla, HIND.
Sarnakassary mara, CAN.
Chendurapa chettoo, TEL.
Capilapodie, TAM.
Shendree or Toong, DUK.
Corunga Munje-mara, CAN.

Monkey faced tree, from these animals rubbing their faces with the fruit. A large tree with alternate, ovate oblong leaves, of a ferruginous colour beneath; flowers in the cold weather. Fruit size of a pea, covered with a red mealy powder, used as a dye.—*Riddell.* The tree is common in the Deccan and the Northern Circars,—*M. E. J. R.* also in the Kotah jungles and in Mewar.—*Gen. Med. Top. page* 211. It grows also in the Sikkim Himalaya, and yields a brown-dye.—*Hooker, Vol.* I. *page* 14. The red mealy powder which covers the capsules is used in Mysore to dye silk. Wood soft and inferior. Mysore. 16; 26.—*M. E. J. R.* These somewhat varied statements, are all, perhaps, reconciled in the following remarks, by Dr. Cleghorn, one of India's most accurate writers. He says ' the stellate pubescence covering the 3-coccous capsule of this large tree, is collected for sale in Mysore, where it is used for dyeing silk an orange colour. In the Edinburgh Philosophical Journal, April 1855, Professor Anderson of Glasgow gives a very satisfactory report on the olouring matter of this dye, and the trials which e has made with it are sufficient " to show that t really merits the attention of silk dyers." The tree is widely spread over the Madras Presiency, and large supplies of the dye might be asily obtained. The colouring matter does not equire a mordant, all that is necessary being to nix it, with water containing about half its weight of carbonate of soda. " On silk, the colour s a rich flame or orange tint of great beauty nd extreme stability;" and " the fact that the naterial supplied by commerce, contains between 0 and 80 per cent. of real colouring matter, ught to induce the silk dyers of this country to urn their attention to it."—*M. E. J. R.* Ainslie escribes it as a fine, reddish brown, light owder, which the Natives employ for dyeing a eautiful pale orange colour: he was for some ne, a good deal at a loss to know from what act plant it was obtained, till he discovered, Dr. Buchanan's Journey through the countries Mysore, Canara and Malabar, " that it is the d dust shaken from the dry fruit of the Rotera tinctoria, and is an export from Malabar, here the tree is called Corunga Munje-marum. —*Ains. Mat. Med. p.* 146. Dr. Honigberger entions that the *Kamila* or *Kamud* of the ahore bazar is what Dr. Royle, in the Illustrated Catalogue of the Great Exhibition, nominates *Rerou*. It is taken to Lahore from the hills, in the form of coarse red powder; is reported to be the hairs of a pod from a tree, and is chiefly used as a purple dye. The Indian name of this article, *Kamila*, is probably a derivation from the Sanscrit "Kamila," signifying Jaundice, as the color of it is a yellowish-red.—*Thirty five years in the East by Dr. Honigberger, p.* 337. Dr. Irvine tells us that the kupila, the dust from the capsule of the fruit, is used to dye silk yellow, alum being used as the mordant: also that it is considered in medicine as of a warm nature, also anthelmintic; and given to children in "dai." Three or four massee are a dose: also used in ointments for herpetic eruptions, price two and a half seers for one rupee.—*Gen. Med. Top. p.* 142. Simmonds merely remarks that, a coloring matter is prepared from the dried fruit of the *Rottlera tinctoria*, by the natives of the East, to dye orange, which is a brilliant and tolerably permanent dye: and adds, it is apparently of a resinous nature.

(7215) ROUGE, a pigment of a beautiful rose colour, procured from the red colouring matter of safflower. It is brought from China spread on small papers, or in pots. See CARMINE.

(7216) ROUREA SOOKURTHOONTEE. CNESTIS MONADELPHA. The rourea abounds in the environs of Tavoy, where the air is often filled with fragrance from its thick snow-white flowers.—*Mason.*

(7217) ROXBURGHIACEÆ, *Roxburgh-Worts*, a natural order of Plants belonging to the class Dictyogens. The species are twining shrubs with tuberous roots; reticulated leaves, coriaceous, and with parallel secondary veins connecting several primary ribs; flowers large and showy, solitary, fœtid; perianth of four large petaloid divisions; stamens 4, hypogynous; anthers adnate, opening inwards, pointed, with connectives projecting far beyond the cells, which separate from the latter as far as their bases; pericarp 1-celled, 2-valved, with two clusters of seeds at the base. Seeds attached to long cords covered with loose hairs just below the seeds; embryo taper, in the axis of fleshy albumen, with the plumule lying within a slit. The plants of this small order are natives of the hot parts of India. There is but one genus—*Roxburghia*, the roots of a species of which are prepared with lime water, candied with sugar, and taken with tea. The flavour is insipid. (Lindley, *Vegetable Kingdom.*) *Eng Cyc.* Dr Wight gives Roxburghia gloriosoides, 2061.

(7218) ROYDSIA, an Indian genus of Plants allied to the natural order *Capparidaceæ*, named by Dr. Roxburgh in compliment to Sir. J. Royds. The genus consists of a single species indigenous in the forests of Silhet, where, with a stout stem and numerous branches, it climbs over the trees to a great extent, and flowers in the month of

March, diffusing a strong but pleasant odour from its numerous blossoms arranged in axillary racemes or terminal panicles. The leaves are alternate, oblong, coriaceous, smooth on both sides, and without stipules. The calyx is 6-partite and of a pale-yellow colour ; corolla none ; stamens numerous, with the filaments inserted on the apex of a short column ; ovary pedicelled 3-celled, with two rows of ovules in each, attached to the axis ; drupe berried, of the size of a large olive, orange-coloured ; pulp abundant and yellow ; nut oblong, single-celled and 3-valved ; seed solitary, conformable to the nut. The plant is figured in Roxburgh's 'Coromandel Plants,' p. 289, and is well-suited to the hothouses of England.—*Eng. Cyc.*

(7219) ROYLEA, a Himalayan genus of Plants belonging to the natural order *Lamiaceæ* and tribe *Balloteæ*, named by Dr. Wallich in compliment to Dr. Royle, author of the 'Illustrations of the Botany of the Himalayan Mountains and of Cashmere,' who first found it on the Sirmore Mountains. The plant forms a handsome shrub, with many branches and an abundance of pale-green glaucous leaves. It is characterised by having the calyx ovate, tubular, 10 nerved, and semi-quinquefid ; corolla shorter than the calyx, 2-lipped, lips unequal ; stamens 4, didynamous, ascending under the upper lip ; anthers bilocular ; style bifid.—*Eng. Cyc.*

(7220) ROYLEA ELEGANS.

Patkuroo, Hind.

The only species known, is called Putkuroo by the natives of the mountains where it is indigenous. It is suited to the shrubberies of England.—*Eng. Cyc.* Is deemed a febrifuge, by the people at the Himalayas, like some species of Teucrium in Europe.—*O'Shaughnessy, p.*492.

(7221) RUBIA, a genus of Plants belonging to the natural order *Galiaceæ*, containing about 40 species, found both in Europe and Asia. This genus is characterised by flowers monopetalous, superior ; tube of the calyx ovate-globose limb scarcely any ; corolla sub-campanulate, rotate, 5-partite ; stamens 4-5, styles 2, short ; berries 3, 1-seeded.—*Eng. Cyc.*

(7222) RUBIA CORDIFOLIA, DeCandolle. Manjith. Bengal Madder. Roxb. Rubia Manjista. Roxb. Indian Madder.

Manjista, Sans.
Manjtittie vayr, Tam.
Manjistha ; Munjeet
Cho. munjeet, Hind.

The Munjeet of India, a native of Nepaul, &c., possesses very similar properties, to *R. Tinctorum* and is imported into England from Calcutta. The root is used as a substitute for that of *R. tinctorum* : it is known in commerce under the name of East Indian Madder, and is also employed in medicine. Like Madder, Munjeet was probably known from very early times, as Rodeen is given as the Greek name in Persian works on Materia Medica. R. *Chilensis* and *R. Relbun*, both natives of South America, are also esteemed there as dyes. Lindley, *Vegetable Kingdom*).—*Eng. Cyc.* Rubia cordifolia. Indian madder, though not seen in the Tenasserim Provinces, is found in Burmah.—*Mason.* It is much cultivated in Boondee, Kotah, and Mewar, in black loam, the root is largely exported. A beautiful crimson lake colour is dyed with it in Rajpootanah.—*Irivine.* The Hakeems are in the habit of prescribing an infusion of it, as a grateful and strengthening drink, to weakly women after lying in. Manjeittie is also called in Tamools Sawil codic.—*Ains. Mat. Med. p.* 82. *Rubia Munjista* is substituted in Lahore and Hindostan for the Rubia tinctorum used in Europe. I believe this article (important in a commercial view at Lahore) is now also cultivated in Europe. Camel loads of madder are brought from Banu and Tonk (on the west side of the Indus) to Lahore. On the Cashmerean mountains this plant is met with growing wild, but is not used. —*Thirty-five years in the East, by Dr. Honig. p.* 337. See Madder.

(7223) RUBIA TINCTORUM. Madder.

Menjithe, Hind.

R. tinctorum, Madder, has been long known, and was employed in medicine even in the time of Hippocrates, but is valued chiefly as a dye. It has a diffuse brittle-branched stem, angular, very rough, with sharp hooks ; leaves 4 or 6 in a whorl, lanceolate or oblong-lanceolate, mucronate, somewhat membranous with pinnated veins; flowers small and white ; lobes of the corolla ovate-lanceolate, apiculate ; anthers ovate-oblong; stigmas conical. It is a native of Europe and Asia Minor, but is now extensively cultivated in Holland and France ; the culture has likewise been attempted, and successfully, in Great Britain but the English madder could not be sold so cheap as the foreign ; it is therefore still largely imported, chiefly from Holland, France, Italy, and Turkey, though since cochineal has become cheaper, it is much used for the same purposes. It is employed by dyers and calico-printers as a red and scarlet dye. It has also the singular property of turning red the bones and secretions of fowls and other animals fed on it. The two species, R. tinctorum and R. manjista, are natives of the south of Europe, the Levant, and Asia Minor, cultivated in India, and in many parts of Europe. The roots are creeping, the thickness of the little finger, very long and branching, provided with numerous articulations, and tough fibrils, epidermis thin, pale brown, bark and meditullium intensely red. The odour is weak and peculiar, taste bitter and styptic. According to Kuhlman's analysis the roots contain red colouring matter, (*Alizarin*, Robiquet,) yellow do, (*Xanthine*, Kuhl.) woody fibre, mucilage, gum, sugar, bitter matter, resin, salts albumen, &c, *Alizarin* occurs in orange red crystals tasteless, inodorous, little soluble in cold, but soluble in boiling water also in alcohol, ether the fixed oils, and alkalies. The alcoholic solution is rose coloured, the etherial golden, the alkaline violet or blue. A solution of alum added to a solution of alizarin, and precipitated by potash, gives a rose lake of the most charming tint. *Xanthine* is yellow, very soluble in water and alcohol, slightly in ether; the solution passes to orange-red by contact with alkalies, to lemon-yellow by acids. It is devoid of odour, but has a sweetish bitter taste. The red colouring matter of madder tinges the bones, milk, and urine of animals if fed on the roots. The great consumption of madder is as a dye stuff for giving a red colour to wool, silk and cotton. In pharmacy the roots are sometimes used for colouring ointments.—*O'Shaughnessy, page* 378.

(7224) RUBUS (the Latin *Rubus*, a Bramble) a genus of Plants belonging to the natural order *Rosaceæ*, and to the section *Potentilleæ* of the sub order *Rosaceæ* proper. This genus, like that of *Rosa*, has proved a source of difficulty and difference amongst botanists. Some writers on the British Flora have described upwards of twenty-five species, whilst others have reduced them to four or five, or even two.—*Eng. Cyc.* Dr. Wight gives Rubus Gowreephul, 230; lasiocarpus, 232; rugosus, 225; Wallichianus, 231.

(7225) RUBUS CONCOLOR is found in the Himalayas, as also in Cashmere.—*Honig, p.* 337.

(7226) RUBUS FRUTICOSUS, Shrubby Bramble, or Common Blackberry, is one of the most common species of the genus. It has a 4-angled erect stem, rather tomentose, bearing recurved prickles, 3-5 leaflets, each on a secondary petiole; rose coloured or white flowers arranged on a panicle; reflexed sepals, almost without prickles; purplish black fruit. It is a native of almost all Europe, in hedges, thickets, and woods. There are no less than ten generally admitted varieties of this species and some botanists make many more. The fruit of this species and its varieties are well known as blackberries, or bumblekites, and also scald-berries, from their supposed power of giving scald-head o children.—*Eng. Cyc.*

(7227) RUBUS GOWREEPHUL, WILD RASPBERRY. Griffith says there is a species of Rubus in the Tenasserim Provinces, and Wallich ound one on the Irrawaddy; but whether ither produces an edible fruit or not, I am unable to say. The existence of an indigenous pecies, though worthless itself, is however, interesting; as it indicates that the true raspberry might be propagated with success.—*Mason.*

(7228) RUBUS IDÆUS. Common Rasperry, or Mount Ida Bramble. The whole plant s villose, stem round, with slender recurved prickes; leaves pinnate, with 3 or 5 ovate serrated eaflets, tomentose beneath; flowers drooping; petals obovate, wedge-shaped, entire conniving, horter than the calyx; carpels numerous, tomentose. It is a native of woods in Europe from Norway and Sweden to Spain and Greece. It is found also in Asia on the Himalayas, in the north Africa, and in America from Canada to Pennsylvania. It is found abundantly in almost every part of Great Britain and Ireland.—*Eng. Cyc.* *Rubus Idæus*, does not grow in Hindostan: a nearly allied species viz.,

(7229) RUBUS INDICUS, ROTTL. BRAMBLE BERRY (Spec. of).

Gowry pull, HIND.

Gowry pull is the Hindoostanee name of a species of Bramble berry common amongst the woods betwixt Hurdwar and Sirinagar: it also grows plentifully in Mysore and Wynaad, but I know not the Canarese name of it.—*Ainslie, page* 225.

(7230) RUBUS LASIOCARPUS. ROSACEÆ. Blackberry,

Gowreephul. DUCK.

Now cultivated generally in the Deccan, and believed to have been first brought from the Mysore Hills. It grows easily from seed; a few of the ripe fruit rubbed on a sheet of paper, and dried in the sun, will enable you to forward the seed to friends at any distance. (The same with the strawberry.) The plants should never be nearer than four or five feet, and may be cut down at the commencement of the rains, when they will throw out fresh shoots, and bear fruit in abundance. As it requires little care, and only an occasional supply of water, this bramble forms a very perfect and secure hedge to a kitchen garden. The finest fruit is very inferior to a common raspberry.—*Riddell.*

(7231) RUBUS MICRANTHUS, Small-Flowered Bramble, has an upright, round, branched stem, pinnnate leaves, with 5-7 oblong, ovate, doubly serrate, tomentose beneath, and green above leaflets, with small reddish-purple flowers arranged in corymbs, and black fruit. It is a native of Nepaul, and one of the most gigantic of the genus, attaining a height of 8 or 9 feet. It is easily distinguished by its nearly erect, smooth, dark mahogany-coloured shoots, and very long pinnate leaves. The shoots sometimes attain a length of 20 feet. There are two other species, *R. distans* and *R. asper*, found with this in Nepaul, which have been grown in England.—*Eng. Cyc.*

(7232) RUBUS RUGOSUS. The Raspberry. This plant never grows in the Deccan; a wild species is described by Graham as found in Mahableshwar.—*Riddell.*

(7233) RUBUS VULGARIS. RUBUS FRUTICOSUS like *R. Idæus*, grows at Cashmere.—*Thirty-five years in the East by Dr. Honig. p.* 337.

(7234) RUBY.

Kemboo also Segapoo kulloo, TAM.	Yacout, ARAB.
Lal, HIND.	Lankaratti, CYNG,
	Manekam, MALAY.

Colour blood-red or rose-red, sometimes a tinge of violet; primary form as above, and generally occurs in 6-sided prisms. It is not so hard as the Sapphire, and is more readily cleaved. Like the Sapphire, it consists of pure alumina. "The largest oriental ruby known was brought from China to Prince Gargarin, governor of Siberia; it afterwards came into the possession of Prince Menzikoff and now constitutes a jewel in the Imperial Crown of Russia." (Dana.)—*Eng. Cyc. page* 151. This beautiful gem can be procured in Ceylon, but Rubies are still more abundant and of a much finer kind in the Dominions of Ava, whence they are brought to India.—*Ains. Mat. Med p.* 166.

(7235) *Spinelle Ruby.* Mr. Mason says, "By far the larger proportion of the rubies offered for sale, are, it is believed, spinelle rubies. I have a small a specimen which every native, who has seen it, regards as one of the best kind of rubies, or red sapphire, but its natural crystalline form is easily recognised, as a regular octahedron; while that of the oriental ruby is a six sided figure, or some of its modifications. They are seen of all shades. Blood red, the proper spinelle ruby; rose red, the balas ruby; orange red or rubicelle; and violet colored or almandine ruby. It is not an easy task to distinguish, accurately, the true character of the different stones offered for sale as rubies. Both Europeans and natives often make great mistakes. An English officer bought a "ruby" in Maulmain a few years ago for fifteen rupees, his friend bought one for five rupees: and the rubies were thought to be of nearly equal value; but on walking into a jeweler's shop in Calcutta, a year or two afterwards, the jeweler offered *four hundred* and *fifty* rupees for the one, but refused to give two rupees for the other, characterizing it as "a worthless garnet."—*Mason.*

(7236) *Rubies.* Captain Newbold mentions that fine rubies have from time to time been discovered in many of the corundum localities he enumerated, associated with this gem, particularly in the gneiss at Viralimodos and Sholasirasmany, and the natives informed him that it occurs in the Trichingode talook and at Mallapollaye, though comparatively speaking rare.—*M. J. L. & S.*

(7237) RUDBECKIA FULGIDA. This is a showy genus of plants, and will grow in any common soil, they attain a large size, and are therefore more adapted for a shrubbery; the colours chiefly yellow, and orange; propagated by seed or by dividing the roots.—*Riddell.* The name was given by Linnæus, to honor the memory of his predecessors the Rudbecks, father and son, in the botanical chair at Upsal. It belongs to the natural order *Compositæ*, and possesses many species. Some of these are well known in gardens. They are herbaceous, biennial and perennial.—*Eng. Cyc.*

(7238) RUDRA KUDAPA.

Rudra cuddapah, TEL.
Roodra kurpah, HIND.

(7239) RUE. In *India*, this name is given to the herb of *Ruta angustifolia*; of *R. Graveolens*; and of *R. Indica*.

Arooda, TAM.
Suddap, ARAB. & DUCK.
Saturee, HINDEE.
Sadsab, MALAY.
Ruta Graveolens.

Ruta graveolens. An evergreen shrub, grows freely in any good soil, used for fowls in the Roup, propagated by cuttings in damp weather. —*Jaffrey.* The leaves of Rue dried and burnt are much used in Southern India for the purpose of fumagating young children suffering from catarrh. They also used fresh bruised and mixed with Arrack as an external remedy in the first stages of paralytic affections. When dried in the shade and powdered the vytians prescribe this article in conjunction with certain aromatics in cases of Dyspepsia they likewise entertain the same notion regarding it that Dioscorides did of old, viz. that it is inimical to the fœtus in utero when given together with camphor and the sugar of the palmyra toddy.—*Ains. Materia Med: p.* 38. In making confection of Rue, the herb of dried rue the sudab of the bazars of N. W. India, may be substituted.—*Beng. Phar. p.* 273

(7240) RUELLIA, a genus of Plants belonging to the natural order *Acanthaceæ*, which was so named by Linnæus in compliment to J. Ruelle, physician of Francis I., who wrote commentaries on Dioscorides, as well as some other botanical works. The genus, as formerly constituted, embraced a great many Indian species, which are now distributed among some other genera. The species are distributed through the tropical and subtropical parts of Australia. It includes many highly ornamental plants, as are also those which have now been excluded from it: all are easily cultivated, and often to be seen in English hot-houses. Some of the species which have now been removed to other genera are found at considerable elevations on the sides of the Himalaya Mountains; of these the most remarkable is *Æchmanthera* formerly *Ruellia gossypina.* Which has its stems covered with a thick coating of white tomentum, which probably enables it to withstand a greater degree of cold than most others of the family. The leaves of *R. strepens* are subacid. A valuable dye, called Room, is obtained in Assam from a species of *Ruellia.* Wight gives Ruellia *litoralis*, 447; and punctata, 1563. Voigt and Roxburgh name and describe the following species viz; balsamica; bracteata; cernua; comosa; dependens; fasciculata; flagelliformis; flava; hirsuta; hirta; imbricata; infundibuliformis; latebrosa; longifolia; maculata; obovata; patula; Pavala; racemosa; ringens; salicifolia; Sarmentosa; suffruticosa; triflora; uliginosa, and zeylanica.—*Voigt: Roxburgh.*

(7241) RUELLIA. *Species.* A species of Ruellia, under the name of "roum," is employed in its raw state by the Khamptis and Lingphos to dye their clothes of a deep blue. It is described by the late Dr. Griffiths as "a valuable dye and highly worthy of attention." It might perhaps be usefully employed as the ground for black dye. —*Hooker.*

(7242) RUELLIA INDIGOFERA The Burmese cultivate a low Ruellia plant as a substitute for indigo which is the *room* of Assam, from which country it has probably been introduced. It forms a blue dye not inferior to that produced by the true indigo plant.—*Mason.*

(7243) RUELLIA INDIGOTICA. In China, says Fortune, in one part of theChekiang province, and also amongst the Fung-hwa mountains to the westward of Ningpo, there are large quantities of a blue dye produced, which is in fact the indigo of that part of the country. Those who have read my 'Wanderings in China,' published in 1846, may remember the account given there of a valuable kind of Indigo, made from a species of woad (Isatis indigotica) which is cultivated extensively in the level country a few miles to the westward of Shanghæ. The kind which attracted Mr. Fortune's attention in Chekiang is equally valuable, if not more so. It is made from a species of Ruellia, which until it gets a better name, may be called Ruellia indigotica. It is a curious circumstance that the same plant, apparently, has lately been discovered in the Assam country in India, where it is also cultivated for the blue dye it affords. I had an opportunity of examining it in the garden of the Agricultural and Horticultural Society at Calcutta, where it was standing alongside of the Chinese kind, to which it certainly bears a most striking resemblance: the point of identity will easily be determined when the plants come into flower. Strange it will be if it is ultimately found that this species, which produces a dye unknown to commerce, is in cultivation all the way across from the eastern shores of China to the borders of Bengal, and this is far from being improbable. This Ruellia seem to be easily cultivated, it grows most luxuriantly, and is no doubt very productive. Having evidently been found indigenous a little further to the south, in a warmer latitude, t is not hardy in the province of Chekiang any more than cotton is about Shanghae; but nevertheless it succeeds admirably as a summer crop. It is planted in the end of April or beginning of May, after the spring frosts are over, and s cleared from the ground in October before hose of autumn make their appearance. During his period it attains a height of a foot or a foot and a half, becomes very bushy, and is densely covered with large green leaves. The Chinese method of preserving plants for next year's crop is most ingenious and well worth notice. Being somewhat tender, as I have already remarked, the roots which are left in the ground after the gathering season are all destroyed by the first rosts of winter. But the Chinese cultivator does not depend upon these for the crop of the following year, nor does he take them up or cover them in any way. They have done their duty for one year, and are now left to their fate. Cuttings are found to be much more vigorous and productive than the old roots and to the formation and preservation of these cuttings the Chinese cultivator directs his attention. When the stems are cut down for the manufacture of indigo, a sufficient quantity have their leaves stripped off, and are afterwards taken into a house or shed to be properly prepared. The leaves thus stripped from the cuttings are thrown into the tanks with the other stems and leaves so that nothing is lost except what is actually required for the purposes of propagation. The stems are now tied up firmly in large bundles, each containing upwards of 100, and the ends of each bundle are cut across, so as to leave them perfectly neat and even both at top and bottom. These bundles are each about a foot long, and, of course, nearly round. Having been thus prepared they are carried to a dry shed or outhouse, where, in some snug corner, they are packed closely and firmly together, and banked round with very dry loam. A portion of the dry soil is also shaken in between the bundles, and this being done the operation is complete. Should the winter prove unusally severe, a little dry straw or litter is thrown over the surface of the cuttings, but nothing else is required. During the winter months the cuttings remain green and plump; and although no leaves are produced, a few roots are generally found formed, or in the act of forming, when the winter has passed and the season for planting has come round. In this state they are taken to the fields and planted The weather during the planting season is generally showery, as this happens about the change of the monsoon, when the air is charged with moisture. A few days of this warm showery weather is sufficient to establish the new crop, which now goes on growing with luxuriance, and requires little attention during the summer; indeed none, except keeping the land free from weeds. In the country where this dye is grown, there are numerous pits or tanks on the edges of the fields. These are usually circular in form; and one which I measured was eleven feet in diameter, and two feet in depth. About 400 catties of stems and leaves are thrown into a tank of this size, which is then filled to the brim with clear water. In five days the plants are partially decomposed, and the water has become lightish-green in colour. At this period the whole of the stems and leaves are removed from the tank with a flat-headed broom made of bamboo twigs, and an admirable instrument for the purpose. When every particle has been removed, the workmen employed give the water a circular and rapid motion with the brooms just noticed, which is continued for some time. During this part of the operation another man has employed himself in mixing about thirty catties of lime with water, which water has been taken out of the tank for the purpose. This is now thrown into the tank, and the rapid circular motion of the water is kept up for a few minutes longer. When the lime and water have been well mixed in this way the circular motion is allowed to cease. Four men now station themselves round the tank and commence, beating the water with bamboo rakes made for this purpose. The beating process is a very gentle one; as it goes on the water gradually changes from a greenish hue to a dingy yellow, while the froth becomes of a beautiful bright blue. During the process the head workman takes a paleful of the liquid out of the tank and beats rapidly with his hand. Under this operation it changes colour at once, and its value is judged of by the hue it presents. The beating process generally lasts for about half an hour. At the end of this time the whole of the surface of the tank is covered with a thick coating of froth of the most brilliant colours, in which blue predominates, particularly near the edges. At this stage it being desirable to incorporate the froth with the liquid below it, I witnessed a most beautiful chemical operation which took me completely by surprise, and showed how universally must be the knowledge of the effect of throwing "oil upon the waters." A very small portion of cabbage oil—only a few drops—was thrown on the surface of the froth, the workmen then stirred and beat it gently with their flat brooms for a second or two, and the whole disappeared as if by some enchanter's wand. And so small a quantity of oil was necessary for this purpose that even when the cup had been emptied, and had only the oil that was necessarily adhering to its edges, it was thrown into another tank, and produced the desired effect. The liquid, which is now darker in colour is allowed to stand quiet for some hours, until the coloring matter has sunk to the lower stratum, when about two-thirds of the surface is drawn off and thrown away. The remaining third part is then drawn into a small square tank on a lower level, which is thatched over with straw and here it remains for three or four days. By this time the colouring matter has separated itself from the water, which is now entirely drained off—the dye occupying three or four inches of the bottom in the form of a thick paste, and of a beautiful blue colour. In this state it is packed in baskets, and exposed for sale in all the country towns in this part of China. What its intrinsic value may be when compared with the indigo of commerce; I have no means of ascertaining but it is largely used in this part of the world, where blue is the most fashionable colour, judging from the dresses of the people, and it is possible that with our knowledge of chemistry a colour of this kind might be greatly improved. After being grown and manufactured, as I have described, it is sold at rates varying from 50 to 100 cash a catty, say from 2*d* to 4*d* per lb. Some is sold as low as 30 cash, but this is very inferior, the greater part produced is sold at from 60 to 80 cash a catty, and it must be of a very superior quality if 100 cash is paid. Like the Shanghae indigo made from Isatis indigotica, it is called "Tien-ching" by the Chinese.—*Fortune.* Amongst other productions of the highland valleys, the ruellia, formerly noticed, is cultivated extensively for the blue dye which it affords. During the season of its preparation every mountain stream is colored and polluted with the refuse liquid drawn off from the tanks and the stench which fills the air is almost unendurable —*A Res. among the Chi. page* 189.

(7244) **RUELLIA RINGENS.** Lin.

Upu-dala, HORT: MAL.

The juice of the leaves of this plant, boiled with a little salt, Rheede says, is supposed, on the Malabar coast, to correct a depraved state of the humours. See Hortus Malabaricus. Part 9th *p.* 125.

(7245) **RUELLIA STREPENS.** WHORL FLOWERED RUELLIA.

Kirendinyagum, TAM. | Grendie Tagarum SANS.

The small purple coloured leaves and berries of this low growing plant are sub-acrid and bitterish to the taste. When bruised and mixed with castor oil they form a valuable application in cases of children's carpangs —*Ains. Mat. Med. p.* 83.

(7246) **RUFFICKEE**, a plant from the fibres of the bark of which the Lepchas near Darjeling make remarkably light and strong fishing nets.

(7247) **RUGS, WOOLLEN.** The principal site of the manufacture of these rugs was long the town of Ellore, in the Northern Circars of the Madras Presidency, but they are now made in Mysore and although of any size, to order, they are usually three feet broad and six feet long, and are much employed as sleeping rugs, and rugs for the drawing room. They have latterly been exported largely to England where they are employed as hearth rugs: they are of various colours, prettily arranged, sell for four Rupees there, to rupees fourteen, according to size.

(7248) **RUM.**

Rum, GUZ. HIND.

A spirit procured by distilling a fermented fluid prepared from the refuse in the operation for making sugar the peculiar flavour being derived from an essential oil existing in the juice of the cane. The best is made from molasses, and it is preferred when well kept, of good age, considerable body, smooth oily taste, and a brownish transparent colour. Bengal, the West India Islands, and Guiana, are the countries chiefly distinguished for the produce of rum.—*Faulkner.*

(7249) RUMEX ACETOSA. SORREL.

Chuka ke Bino. HIND.

The seed is considered cooling and astringent: It is cultivated in Ajmeer.—*Gen. Med. Top. p.* 130.

(7250) RUMEX ALPINUS, or Monk's rhubarb, is found on the European Alps, the Crimea, and Mount Caucasus. The roots are large and purgative like rhubarb, and the whole plant so resembles the Rheum that Linnæus himself mistook one for the other.—*O'Shaughnessy, p.* 522.

(7251) RUMEX OBTUSIFOLIUS vegetates in Cashmere, and is eaten by the natives. Its root, under the name of Radix Spathiacuti, was formerly used as a purifier of the blood in chronic cutaneous diseases, but is now obsolete, both in India and in Europe, its active principle, Lapatin, must, however, have peculiar properties. From the decoctions of the dried roots of various sorts of sorrel, by the addition of alum, can be obtained a fine red color, at a low price and valuable to ainters. Rumex undulatus (Royle) is *Hímaz* r *Pulkee.—Thirty five years in the East, by Dr. Ionig. p.* 338.

(7252) RUMEX VESICARIUS. Lin. Counry Sorrel.

Sookan keeray, TAM. | Chuckka ke baujee, DUK.

Cultivated for greens, &c., grows plentifully bout Madras in the field during the rains. his plant has obtained the name of Sorrel from he English in India, owing to its great resemlance to the Rumex acetosa in taste and other atural qualities. It is an article of diet and considered by the Natives as cooling and perient.—*Ains. Mat. Med. p.* 257. This is common native growth, and where water is oundant may be had for eight months in the ear; it is sown in drills or on the edges around her beds; the leaves are sold in bundles from ne to two pice a seer. There is also another pecies called the Indian Red Sorrel.—*Riddell.*

(7253) RUMINANTIA, Cuvier's name for s eighth order of Mammiferes. They constitute e *pecora* of Linnæus. Cuvier remarks that this perhaps the most natural and the best defined the class; for these animals have the air of eing nearly all constructed on the same model; d the camels alone present some small excepons to the common character. Cuvier makes the uminants consist of two divisions;—first, those thout horns; secondly, those with horns. e first division embraces the Camels (*Camelus* nn.), or the Camels properly so called, and e Llamas; and the Chevrotains (*Moschus*, nn.). Secondly, all the rest of the Ruminants, the male sex at least, have two horns or proinences, more or less long, projecting from the ontal bones, which is not found in any other mily of mammals. In some, these prominens are covered with a case of elastic substance composed, as it were, of agglutinated hairs, which grows in layers, and during the whole life of the animal. The name horn (corne) is particularly applied. The bony prominence or core which this case envelops, grows, like it, during the whole life of the animal, and is never shed. Such are the horns of oxen, sheep, goats, and antelopes. In others the prominences are invested only with a hairy skin, which is continued from that of the head, and is never destroyed during life. These prominences are never shed. Finally, in the great genus *Cervus*, Linn., the prominences covered during a certain period with a hairy or velvety skin resembling that of the rest of the head, have at their base a ring of bony tubercles, which, as it increases, compresses and obliterates the nutrient vessels of that skin, which, when the horn is complete, dries and is removed. The naked bony prominence separates in due time from the skull, to which it grew, falls, and the animal becomes defenceless. But new horns soon begin to bud, ordinarily, and while the animal is in the vigour of life, larger than the preceding ones, and destined to fall in their turn. These horns, purely osseous and subjected to periodical changes, are termed by the French Bois, and are known in England by the name of Antlers. Mr. Swainson divides the *Ungulata* into the following five tribes—*Ruminantes, Pachydermes, Anoplotheres, Edentates,* and *Solipedes.* The *Ruminantes*, are thus arranged:—

1. Sub-typical group.—Horns sheathing; form gracile, slender.

Family *Antilopidæ.* ANTILOPEÆ. (Sw.—— *Capridæ*, Smith).

Genera.—*Dicranocerus*, Sm.; *Aigocerus*, Sm.; *Oryx*, Sm.; *Gazella* Sm.; *Antilope*, Sm.; *Redunca*, Sm; *Tragulus*, Sm.; *Raphicerus*, Sm.; *Tetracerus*, Leach; *Cephalophus*, Sm.; *Neotragus*, Sm.; *Tragelaphus*, Sm.; *Nemorhædus*, Sm.; *Rupicapra*, *Ant.*, Sm.; *Aplocerus*, Sm.; *Capra*, Auct. *Ovis*, Auct; *Damalis*, Sm.; *Acronotus*, Sm.; *Boselaphus*, Sm.; *Strepsicerus*, Sm.; *Portax*, Sm.

2. Typical.—Horns sheathing; form heavy, robust. Family *Bovidæ*, Sm. [BOVIDÆ.]

3. Aberrant. Horns solid, deciduous. (*Cervidæ*, Sm.; *Cervus*, Linn.) [CERVIDÆ]		Genera and Sub-genera. 1. *Alce*, Sm. (Subgenera *Rangifer* Sm.; *Dama*, Sm.) 2. *Cervus*, Linn., Sw. (Subgenera *Rusa*, Sm; *Axis*, Sm.) 3. *Capreolus*, Sm. (Subgenus, *Mazama*, Sm.) 4. *Subulo*, Sm. 5. *Stylocerus*, Sm.
	Horns wanting; fore legs shorter than the hinder. (*Moschidæ*, Sw.) [MOSCHIDÆ]	1. *Moschus*, Linn
	Horns very short, covered with a skin. (*Camelopardæ*, Sw) [GIRAFFA]	1. *Camelopardalis*, Antiq.

The tribe *Solipedes*, which immediately follows the Camelopards, consists of the genera *Camelus*, *Auchenia*, and *Equus*. Thus the Camels and Llamas, with which Colonel Smith, following Cuvier, commences the Ruminants, are placed by Mr. Swainson at the conclusion. With the exception of this and a few other modifications, the two arrangements are similar.—*Eng. Cyc.*

(7254) RUMPHIA, a genus of Plants named by Linnæus in honour of George Eberhard Rumph, is only known from a figure of Rheede published in his 'Hortus Malabaricus,' vol., iv., t. 11. who describes it as being found in Parabaroo and other provinces of Malabar. It has not been seen by any modern botanist. It is usually referred to the natural family of *Terebinthaceæ*, and to the sub-order *Burscreæ*. It has a tubular trifid calyx, 3 oblong petals of the corolla; stamens 3, equal to the petals, and exserted. The ovary is single, 3-cornered; style one; drupe coriaceous, turbinate, 3-furrowed, with the nut 3-celled, 3-seeded. But Messrs. Wight and Arnott remark, that as each apparent stamen may be composed of several filaments, this doubtful genus would be brought near *Byttneriaceæ*.

(7255) RUNGPORE, produces silk corahs, Megilli cloths made of pat (Corchorus olitorius), ginger (the best in Bengal), and tobacco of an excellent quality: and from the neighbouring country of Bhotan, specimens of the beautful long glossy hair of the tail of the Yak of which chowrees are made.—*M. C. C.*

(7256) RUPICOLINÆ, a sub-family of Insessorial Birds allied to the Manakins and generally arranged under the family *Pipridæ*.

(7257) *Calyptomena* (Raffles; *Rupicola* (Temminck).—This very singular and beautiful bird is about 6½ inches in length. Its colour is a brilliant green, like that of the parrots, It is the Tampo Pinang of the Malays. It is a native of Singapore and the interior of Sumatra. Sir Stamford Raffles states that this species is found in the retired parts of forests, and as it is of the colour of the leaves, and perches high, it is not easily procured. He further tells us that the stomach contained nothing but vegetable substances, chiefly wild grains. Dr. Horsfield observes that the bill greatly resembles that of the genera *Rupicola*, *Pipra*, *Phibalura*, *Pardalotus*, *Platyrhynchus*, and *Procnias.*—*Eng. Cyc.*

(7258) RUPPELLIA (Milne-Edward), a genus of *Crustacea* belonging to the family *Canceridæ* (Canceriens Arqués), established on the *Cancer tenax* of the German zoologist and traveller Ruppell, and considered by M. Milne-Edwards as the type of the small group which leads to the genera *Ozius* and *Eriphia*. The form of the carapace approximates closely to that of *Xantho* and *Ozius*; dorsal buckler slightly curved, and about one and a half as wide as it is long; the orbits are nearly circular, and are directed upwards and forwards. The interal antennæ bend back directly outwards, as in *Xantho*, &c.

(7259) RUPPELLIA TENAX, CANCER TENAX, Ruppell, has the upper border of the orbit marked by two fissures separated by a small tooth; there is a fissure at its external angle, and two teeth at its lower borders. Length about two inches. It is a native of the Red Sea.

(7260) RUSHES, GRASSES AND SEDGES. Although these substances are extensively used in India for the manufacture of mats, ropes, baskets, and thatching, there was but a poor display of them in the Exhibition. The Travancore Local Committee and the Canara Local Committee exhibit the *Cyperus textilis*, and a finer kind of grass called kooray or koaray both used for making mats. The celebrated mats of Paulghaut and Cochin are noticed in another class. Several species of Typha, Juncus, and Saccharum are known to abound in this Presidency, and to be applied to useful purposes. The *Phrynium dichotomum* of Bengal is used for making the sital patee mat.—*M. E. J. R.*

(7261) RUSOT. Extract of Barberry.—Berberidis Extractum.—Extract of bark and wood of the Barberry, (Berberis) several species; deep yellow colour, totally soluble in water.—*Beng. Phar.*

(7262) RUSSELIA. *Scrophularineæ.*—This plant with rush like branches bears a deep scarlet trumpet-shaped flower, hanging in long axillary peduncles down the stalk: it blossoms during the greater part of the year, and is highly ornamental, growing luxuriantly in a rich soil It is propagated by layers or cuttings.

(7263) RUSSIA LEATHER.

Cuir de Russie, FR.
Juften, GER.
Cuojo di Russia, IT.
Jachta, POR.
Juft, RUS.
Moscovia, SP.

The tanned hides of oxen, manufactured in manner peculiar to that country. The leather i soft, has a strongly prominent grain, a great deal of lustre, and a powerful aud peculiar odour The colours are principally red or black; th former is much esteemed for binding books, an making articles where a fine durable leather i required the latter is chiefly in demand in Russia for shoe and boot making.—*Faulkner.*

(7264) RUST, RED RAG, RED ROBIN, RE GUM. Uredo rubigo and U. linearis are fung which attack wheat in England.—*Hassell.*

(7265) RUTA, a genus of plants belongin to the natural order *Rutaceæ*. The following is description of this genus:—Calyx 4-partite, deciduous, shorter than the petals, which are fou and unguiculate, with the limb vaulted. Stamens eight, longer than the petals, filament subulate, glabrous; anthers ovate, obtuse. Receptacle broader than the ovary, marked roun with eight nectariferous pores, bearing the petal and stamens at the base. Carpels 4, partly combined by means of the central axis (gynobas into one 4-lobed ovary, ovules 6-12 in each cell. Styles 4, distinct at the base, united upwards into a single pistil which is attenuated towards the apex. Stigmas 4. Capsules 4, partly united dehiscing internally at the apex. Seeds dotted. The species of this genus are suffrutescent, herbaceous, or perennial plants, with alternate exstipulate pinnated or decompound leaves covered with pellucid dots. The flowers are yellow rarely white, and disposed in terminal corymbs or racemes. De Candolle enumerates 24 species of *Ruta*, of which comparatively few are generally known or cultivated.—*Eng. Cyc.*

(7266) RUTA ALBIFLORA, (white-flowered rue) is common on the Himalayas, at an elevation of 5000 to 8000 feet.

(7267) RUTA ANGUSTIFOLIA, (narrow-leaved rue,) (Sudab) is met with in gardens in India, and used medicinally,—*O'Sh. page* 260.

(7268) RUTA GRAVEOLENS. RUE

The herb.

Ruta graveolens, Common Rue, is a glaucous hairless erect herb or half-shrubby plant, with a strong heavy unpleasant smell, growing to the height of about two feet. The leaves are supradecompound, alternate, their lateral lobes linear or nearly so; the terminal ones obovate; they and ll other parts of the plant are covered with ransparent dots. Carpels terminal, leafless, richotomous cymose; petals four, wavy concave, little irregularly toothed. Fruit roundish, varted, four-lobed, each lobe opening into two alves. Rue is sometimes called Herb-Grace, r the Herb of Grace and in some parts of England Ave-Grace. This name is said to have been iven to it on account of its use in exorcisms. n company with rosemary it has been used rom time immemorial as an emblem of remembrance and grace on account of its evergreen liage. The stamens are remarkable for their resenting an instance of vegetable irritability. hen the time is come for the pollen to be introuced into the stigma, and thus presented to the vules, the stamens, which are hard and rigid, nd almost at right angles with the style, approach e stigma one by one, and after remaining in ontact with it long enough to discharge their llen, they return back to their original position rallel with the petals.—*Eng. Cyc.*

(7269) RUTACEÆ, a natural order of Polyetalous Exogenous Plants, characterised by the ssession of hypogynous stamens, two or three mes as many as the petals cohering carpels with m 3 to 5 valves, an entire ovarium with sevel cells, imbricate calyx with four or five divions, symmetrical hermaphrodite flowers with tals either wanting or as many as the lobes of e calyx, mostly twisted in æstivation. Fruit psular, the sarcocarp mostly separating from e endocarp. Leaves without stipules, opposite alternate, simple, deeply lobed or pinnate, and vered commonly with pellucid resinous dots. They are trees, small shrubs, or herbaceous plants.—*Eng. Cyc.*

This order embraces the *Ruteæ* and *Diosmeæ* of A. de Jussieu, which are now made the principal sections of *Rutaceæ*. *Ruteæ* are known by their seeds containing albumen, and by the sarcocarp of the fruit not being separable from the endocarp. In *Diosmeæ* the seeds have no albumen, and the sarcocarp and endocarp are separable into distinct bodies when the fruit is ripe. A. St. Hilare says that the observation of the adhesion of the sarcocarp and endocarp in *Ruteæ* has been made on unripe specimens of the plants, and that when ripe they are as separable as in *Diosmeæ*. Whatever may be the real state of the case, the two sections are too obviously related in structure and general properties to permit of so slight differences elevating them into the importance of distinct natural orders. *Rutaceæ* agree with *Aurantiaceæ* in their dotted leaves, definite stamens, and fleshy disc. With *Xanthoxylaceæ*, *Simarubaceæ*, and *Humiriaceæ* they have also many points of analogy. They are closely allied to *Zygophyllaceæ* through *Peganum*, which Jussieu and other writers place amongst *Rutaceæ*. They are found in the south of Europe, and in our hemisphere extend as far as the limits of the Old World. *Diosma* and allied genera are found at the Cape of Good Hope. Australia possesses Boronias, Phebaliums, Correas, &c.; and great numbers are found in the equinoctial regions of America. Many of the plants of this order emit a powerful and usually offensive odour from the glands that cover their whole surface. These glands are sometimes so full of a volatile oil, that in hot weather the atmosphere surrounding the plant becomes charged with it, so that a lighted taper brought near the plant will cause the air to inflame. This is especially the case with *Dictamnus*. The Diosmas, or Bucku Plants, are used in medicine as antispasmodics. The celebrated Angostura Bark is produced by a plant (*Galipea officinalis*) belonging to this order.—*Royle.*

(7270) RYE.

Rug, DAN.
Rog, DUT.
Seigle, FR.
Roken; GER.
Secale LAT.
Rosch, Sel, Jar, RUS.
Centeno, SP.

A species of grain (*Secale Cereale*), coming nearer in its properties to wheat, than any other grain. It is the bread corn of Germany and Russia; and being of less value to the English farmer than barley, oats, or pease, is, in consequence, very little cultivated in Great Britain.—*Faulkner.*

(7271) RYE FLOUR, is obtained from the Secale cereale, and the seeds are met with in the market, derived of husk. Rye flower is said to be somewhat laxative. The roasted grains are not unfrequently employed in the adulteration of coffee.—*Hassell. Rye Flour*, or meal does not form a paste like wheat flower.—*Hassell.*

S.

(7272) SABADILLA. Fruit of Veratrum Sabadilla, and several other Melanthaceæ.—*Ben. Phar.*

(7273) SABLE.

Zibelline, Fr.	Zibellino, It.
Zobel, Ger.	Sohol, Rus.

A species of weasel (*Mustela Zibellina*), celebrated for the fine quality of its fur, the hairs of which turn with equal ease in very direction. Its colour is generally of a deep glossy brown or black, and sometimes, though very rarely, yellow and white. This animal is a native of Northern Europe and Siberia.—*Faulkner.*

(7274) SABLE FISH : Clupea, Spec.

Willum, Meen, Tam. | Willum mutchic, Duk.

(7275) SACCHARUM, a genus of Indian grasses, and species of which in addition to the *Moonja* and *Shur*, q : v. are used for thatching and for screens, and some for making writing pens and for arrows.—*Royle.* This genus of Plants belongs to the natural order *Graminaceæ.* One of the species yields the well-known product sugar, and is called the Sugar-Cane. The Sugar-Cane was introduced by the Saracens into the south of Europe, but the period is not well ascertained. Gibbon says they introduced it into Sicily soon after they got possession of the island. About the year 1420 sugar was much cultivated by the Portugese in Madeira. In 1503 we read of sugar being imported from the Canaries, and in 1506 sugar-canes were carried thence to Hispaniola in the West Indies. But, besides the Indian cane, another, and a much more prolific kind, that of Otaheite, was introduced into the West Indies about 1794, and about the same time, or in 1796, the China sugar-cane was introduced into India. The Chinese and Indian seem both therefore to have had independent means, that is, distinct plants from which they could extract sugar ; and, as history shews, they did so at very early periods. The genus *Saccharum* contains numerous species, which are usually easily distinguished by their highly ornamental nature, by the light or feathery or rather silk like inflorescence. The species are widely distributed through the tropical parts of the world. The genus is distinguished by the spikelets being all fertile and in pairs, one sessile, the other stalked, articulated at the base, 2-flowered, the lower floret neuter with one palea, the upper hermaphrodite with two paleæ. Glumes 2, membranous. Paleæ transparent, awnless ; those of the hermaphrodite flowers minute, unequal. Stamens 3. Ovary smooth ; styles 2, long; stigmas feathered with simple hairs. Scales 2, distinct, obscurely 2 or 3-lobed at the point. Caryopsis smooth. Some of the species of *Saccharum*, owing to the silex in their cuticle, are so durable that they are employed in India for thatching. such as *S. canaliculatum* and *S. cylindricum.* This is the case with *S. spontaneum*, which also makes good mats. The natives of Bengal make their pens of the narrow stems of *S. semidecumbens* and of *S. fuscum.* The latter, as well as the culms of *S. procerum*, are also used for screens and other economical purposes.—*Eng. Cyc.*

(7276) SACCHARUM CYLINDRICUM. *Syn.* Saguerus Cylindrica. Horses tail grass.

Oola, Hind.

Grows on the Ajmere plains and flowers early in the rains.—*Genl. Med. Top. p.* 174.

(7277) SACCHARUM MOONJA. Surpar.

Surpata, Hind.—*Gen. Med. Top. page* 174.

The Moonja is indigenous to India, it is collected after the rainy season. It is possessed of great tenacity it is used as rigging in all the vesels above Sukkur. It would form an ample supply of half-stuff for paper makers.—*Royle.* It is common at Ajmeer, in the valleys, and very abundant, along with the saccharum procerum, near Jaepoor. The best moonj is made from the floral leaves of this plant, and the best sirkee from the culms. The plant is distinguished from saccharum procerum by the height, which is inferior, the fineness of the culm and narrowness of the leaves.—*Irvine, p.* 175. The Saccharum Munja is used in Bengal for making strong ropes for tying up cattle and drawing water.—*M. E. J. R.* This, the *Moonja* of the natives (*Saccharum Munja*), is collected after the rainy season and kept for use, as it is employe in tying up their cattle at night and for ropes for their Persian wheels. It is said also to b one of the grasses employed for making to ropes by the boatmen about Benares.—*Royle.* Mr. Burns, of the Indus Flotilla, has mentione that the boatmen of the Indus universally em ployed the Moonj (probably the above *Saccharu Munja*) as a towing rope and for the rigging o their vessels, in all places above Sukkur. Bu below that place coir rope is very generally em ployed, being better able, it is believed, to stan the action of salt water. The Moonja, howeve is possessed of great tenacity, as is evident fro two-inch ropes, often fifty fathoms in lengt made of its fibres, being sufficient for draggin their largest or 1200-maund boats up the Indus and consequently against the full force of th stream, even round projecting points. The rope is also possessed of lightness, so advantageous for rigging, and is capable, also, of bearing, without injury, alternate exposure to wet and to subsequent drying. Both qualities being essential for a tow-rope. Mr. Burns has also informed him that plants growing beyond the range of the overflowings of the river, or of the influence of the tides—that is, in the interior of the country, where, indeed, it grows in vast abundance—are possessed of the greatest strength. The upper leaves, about a foot or so in length, are preferred and collected. Having been made up into bundles, they are kept for use. When required for twisting into rope, they are first moistened in water, two men then, sitting opposite on each other, take one of these moist bundles and beat it alternately with mallets, until the loose cellular are separated from the fibrous parts. These are then ready for twisting into the ropes which are so extensively employed on the Indus. It is evident that a continuation of the same process, or the employment of the *Dhenkee* of India, would afford a very ample supply of half-stuff for paper makers, and at a cheap rate.—*Royle, Ind. Fibres, page* 30. Griffith collected nearly one hundred different grasses in the Tenasserim provinces, but Mr Mason was not aware that the description of a single species has ever been pub ished. —*Mason.*

(7278) SACCHARUM OFFICINARUM. SUGAR CANE. Lin.

Karumboo, TAM.
Gunna, DUCK.
Cherooka, TEL.

Tebu, MALAY.
Itchootunda, SANS
Ains. Mat. Med. p. 264.

Saccharum officinarum, the best known spe- ies, or that yielding sugar in India, is cultivated n all parts of that country, and several varieties re known. It was introduced into the south f Europe and the Canaries, and thence into the Vest Indies. Another species introduced from hina, was named *S. Sinense* by Dr. Roxburgh. t was extensively distributed throughout India, nd still is so to some extent, as the canes are rge, rich in juice, and hard enough to resist he attacks of the white ants. Within the last ew years, the Otaheite sugar-cane has been in- roduced from the Mauritius into India, and apidly spread through the country. It is no oubt the same species that was many years ince introduced into the West Indies. It is robably the Canne de Haite of Tussac, or *S. iolaceum.—Eng. Cyc.* See SUGAR.

(7279) SACCHARUM PROCERUM. Lof- y Saccharum, Sirkunda; Sarkara. HIND, Very bundant every where on the sandy ridges and lains, of Ajmere where water is not very far from e surface. The lower parts of the culms, called *sirkundu*," are made into outside checks for oor ways, &c.; the upper parts of the culms, alled "*sirkee*," are made into excellent neat nd cheap mats, much used in thatching, &c. the floral leaves are made into "*moonj*," by separating the fibres, by beating the leaves; this is very much used to make string and rope.—*Gen. Med. Top. p.* 175.

(7280) SACCHARUM SARA.

Shura Goondra, Sur, HIND.

Common in the plains of India. The culms are finer and stronger than surkunda, and are used to make arrows of, in preference to the other species when obtainable. The species of saccharum are often confounded by the natives.—*Gen. Med. Top: page* 175. Saccharum Sara, yields the common "kulm" or *Reed Pen* with which in India, the Arabic and Persian characters are written. The *Shur* or *Sura* of Bengal (*Saccharum Sara*), or the Pen reed grass, Mr. Henly informs Dr. Royle is employed by the boatmen about Allahabad and Mirzapore, and esteemed as a tow-line for its strength and durability even when exposed to the action of water. It is said to be beaten into a rude fibre and then twisted into a rope.—*Royle.*

(7281) SACCHARUM SPONTANEUM: THATCHING GRASS.

Kus; Kush; Kagara, HIND.

Very abundant in the plains, of Ajmere where the blossom in the rains has a beautiful silvery appearance. Brooms are made of the culms, string of the leaves, and the whole is used to thatch with.—*Genl. Med. Top. page* 175. The Karens in Amherst Province cover their houses with the tall grasses which are so abundant on the Coast, and a few Europeans prefer this thatch to that made from the nipa. Two different species of grass Imperata cylindrica, SYN. Saccharum cylindricum, and Saccharum spontaneum, are used for this purpose, both of which were formerly referred to the genus which produces sugar cane. But the sugar grass seen in Maulmain, which flowers two or three feet high, has been removed since Roxburgh wrote, into the genus Imperata. This is one of the grasses used for thatch, and is often mistaken for *Saccharum spontaneum*, which is the other.—*Mason.*

(7282) SACCOLABIUM, a genus of Plants belonging to the tribe *Vandeæ* and the natural order *Orchidaceæ*, now extensively cultivated in hot-houses especially dedicated to their cultivation. This Asiatic genus, is found in the Indian Archipelago, the Malay Peninsula, and thence extending north along the Himalayan Mountains to 30° 4 N. lat., where *S. guttatum* is found on trees, as well as in more southern latitudes. The genus consists of caulescent epiphytes, with 2-rowed coriaceous leaves, which are often oblique at the apex. The flowers are axillary, and either racemose or solitary.—*Eng. Cyc.* Dr. Wight gives Saccolabium guttatum, 1745-6; niveum, 1676; paniculatum, 1676; papillosum, 1672; Rheedii, 1745-6; rubrum, 1673; speciosum, 1674-75; and Wightianum, 917.

(7283) SACCOLABIUM RETUSUM AND S. GUTTATUM: SPOTTED SACCOLABIUM.

Syn. Aerides guttatum.

One of the noblest orchids in the Tenasserim Provinces belongs to the saccolabium, or bag-lip-genus; the lip forming a bag, or spur. The flowers are numerous, white, spotted with rose-violet, and stand on little pedicels all around the stalk so as to form an elegant plume sometimes a foot long, which give the trees on which they grow a most princely appearance. They are profusely multiplied in the neighborhood of Maulmain, and are highly valued in England.—*Mason.*

(7284) SADACHOO OR MADASOO WOOD.

Sadaichee marum, Tam.

(7285) SADDLES.

Selles. Fr.
Sattel, Ger.
Zeen, Guz. Hind.
Selle, It.
Sadla, Rus.
Selles, Sp.

Are seats adapted to the horse's back, formed of wooden frames, covered with leather, cloth, &c. English saddles are reckoned the best. Sherborne and Lynn, are particularly remarkable for this manufacture.—*Faulkner.* Though not coming exactly under the head of embroidery we may yet mention here from the articles at the Exhibition of 1851, the saddle-cloths and matchlock accoutrements from the Rajah of Kotah, a pattern was produced with gold-headed nails, fixed into green velvet. The effect of this was so good as to be greatly admired by some of the best judges.—*Royle Arts &c. of India, p.* 508.

(7286) SAFFLOWER, BASTARD SAFFRON, CARTHAMUS TINCTORIUS.

Usfar, Arab.
Koosum, Kajeerah, Beng.
Cossumba, Can.
Saffloer Bastered Saffran, Dut.
Kurtin, Egypt.
Cartame Saffran batard, Fr.
Safflor, Ger.
Kussumba, Guz. Hind.
Zaffrone, It.
Kussumba, Mal.
Polervoi, Prostoi schafran, Rus.
Kussumba Kum. lottora Sans.
Azafron bastardo, Sp.
Sendorkum, Tam.
Kussumba chetto, Tel.

This annual plant grows in India Egypt, America, and some of the warmer parts of Europe. It is chiefly used for dyeing, producing different tints of red and orange, according to the alterative employed in combination. It also forms the basis of rouge. Safflower is produced in some parts of the Concans, and is extensively cultivated in Guzerat; that obtained from Bengal is considered superior to all the other Indian varieties.—*Faulkner.* Safflower was shown in the Great Exhibition from Celebes, Assam, the vicinity of Calcutta, Dacca, the states of Rajpootana and other places. There are two species: *Carthamus tinctorius*, which has small leaves and an orange flower; and *C. oxyacantha*, with larger leaves and a yellow flower, a native of Caucasus. The former is cultivated in Egypt, the Levant, &c., where it forms a considerable article of commerce. 6,633 cwts. of safflower were imported into the United Kingdom in 1835, of which about one-half was retained for home consumption. Of 5,352 cwts. imported in 1840, nearly the whole came from British possessions in the East. In 1847, about 405 tons were imported; in 1848, 506 tons; in 1849, 407 tons; in 1850, 522 tons. The price of safflower varies from £1 to £8 per cwt., according to quality. That from Bombay is least esteemed, fetching only 20s. to 30s. The annual quantity of safflower, according to Dr. Taylor, exported from the district of Dacca for eight years ending with 1839, amounted to 4,000 maunds, or about 149 tons. The exports through the Calcutta Custom House are occasionally large: in 1824-25 there were about 316 tons; 8,500 Indian maunds were shipped from Calcutta in each of the years 1841 and 1842. The prices in the Liverpool market, in January 1853, were for Bengal, good and fine, £6 to £7 10s. per cwt.; middling, £4 to £4 10s.; inferior and ordinary, £2 10s. to £3.—*Simmonds.*

At the Madras Exhibition of 1855, four specimens of the powder were exhibited from Cuddapah, Chittledroog and Madura, and several packets of the seeds were sent from other districts. The dried florets of "*Carthamus tinctorius*" yield a very beautiful colouring matter, which attaches itself without a mordant. In Madras it is chiefly used for colouring cotton, and produces various shades of pink, rose, crimson, scarlet, &c. In Bangalore, silk is dyed with it, but the dye is very fugitive, and will not bear washing. An alkaline extract precipitated by an acid (Lime juice is commonly used) will give a fine rose colour either to silk or cotton. The colouring matter is not suitable to wool. The coosum is cultivated extensively throughout the Ceded Districts, &c, the seed yielding an oil, and the flower a dye. The flower is gathered and rubbed down into a powder, and sold in this state. When used for dyeing it is put in a cloth and washed in cold water for a long time, to remove a yellow colouring matter; it is then boiled and yields the Pink dyeing liquid. The Chinese safflower is worth four times the amount of the Indian article (Professor Solly), and the loss from careless drying and preparation has too often been set down to the "nature of the article."—*M. E. J. R.* According to Tomlinson, *Safflower* is the dried flowers of *Carthamus tinctorius*, the chemical principles of which are given under Carthamus. It is an annual composite plant, cultivated in India, Egypt, Spain, and the Levant, &c. on account of its dyeing properties. The flowers are the only parts used in dyeing: these yield two sorts of colouring matter; the first yellow, and of little value; the second, a pink of great delicacy and beauty, but not very permanent. The yellow colour of safflower is soluble in water, the pink is resinous in its nature, and is best dissolved by the fixed alkalies. The flowers of the carthamus are gathered, placed in a bag, and trodden under water to get rid of the yellow colour. They are then placed in a trough with soda, in the proportion of 6 lbs. to 120 lbs. of carthamus. After soaking for a time, the contents of the trough are transferred to another, having a perforated bottom, but lined with a finely-woven cloth. This perforated trough is placed over an unperforated empty one, and water is poured through the upper one. This carries with it a large amount of the colouring matter released by the alkali. When the lower trough is full the bath is placed over another trough. A little more alkali is added and fresh water, until the latter runs through without carrying any more colouring matter. Lemon juice is added to the dye stuff in the troughs, and raises the colour to a bright cherry-red. silk, in hanks, is then immersed and turned round skein-sticks in the bath as long as it will take up any colour. It is then dried, and if the colour be not deep enough, it is passed through another bath of similar strength. A final brightening is given by turning the silk round the skein-sticks 7 or 8 times in warm water with lemon-juice, in the proportion of half a pint to each pailful of water. This colour will not bear the action of soap, nor will it long withstand exposure to the sun and air ; it is chiefly employed on silk for imitating the fine dye of the French called *ponceau*. For *ponceau*, or flame-colour, the silk is first boiled, and then eceives a slight foundation of annotto ; but it must not be alumed. Safflower is a costly dye : t is chosen in flakes of a bright pink colour ; hat in powder, dark-coloured, or oily, is of infeior quality. The beauty of the colour, in its urest form, has caused it to be employed in the manufacture of *rouge*. The preparation of rouge rom cochineal is described under CARMINE. The delicate and beautful rouge, known as *rouge egetale*, is nothing more than the colour of afflower which has been extracted by means of rystallized soda, precipitated by citric acid, hen slowly dried, and ground up with the purst talc. Dr. Ure's account of the process of rouge-making from safflower is as follows : "The owers, after being washed with pure water till comes off colourless, are dried, pulverized, and igested with a weak solution of crystals of soda, which assumes thereby a yellow colour. Into his liquor a quantity of finely carded white cotton wool is plunged, and then so much lemon-juice or pure vinegar is added as to supersaturate the soda. The colouring matter is disengaged, and falls down in an impalpable powder upon the cotton filaments. The cotton, after being washed in cold water, to remove some yellow colouring particles, is to be treated with a fresh solution of carbonate of soda, which takes up the red colouring matter in a state of purity. Before precipitating this pigment a second time by the acid of lemons, some soft powdered talc should be laid in the bottom of the vessel for the purpose of absorbing the fine rouge, in proportion as it is separated from the carbonate of soda, which now holds it dissolved. The coloured mixture must be finally triturated with a few drops of olive-oil in order to make it smooth and marrowy. Upon the fineness of the talc, and the proportion of the safflower precipitate which it contains, depends the beauty and value of the cosmetic. The rouge of the above second precipitation is received sometimes upon bits of fine-twisted woollen stuff, called *crepons*, which ladies rub upon their cheeks"—*Tomlinson.* See CARTHAMUS.

(7287) SAFFLOWER OIL. CARTHAMUS TINCTORIUS.

Chendoorookoo yennai, TAM.
Koosumba, noonay, TEL.
Kurrur or Coosum ka tael, HIND.

A light yellow clear oil is obtained from the seeds of the plant, yielding the well known dye. It grows plentifully in Mysore and Tinnevelly. In Mysore and Bellary, it costs about Rs 2-8-0 per maund, and is used for lamps, culinary and other purposes.—*M. E. J. R.*

(7288) SAFFLOWER SEED.

Kurdeh, GUZ. and HIND.

The seed of the *Carthamus tinctorius* is triangular shaped, of a whitish yellow colour, and affords an oil used by the natives of India for culinary purposes. Kurdeh has of late been exported from Bombay to England and France as an "oil seed"—*Faulkner.*

(7289) SAFFRON. CROCUS SATIVUS.

Zaifran, ARAB.
Khohoon, CYNG.
Safran, DUT.
Safran, FR.
Saffran, GER.
Saffron, SP.
Keysur, Zaifran GUZ. HIND.
Zafferano, IT.
Crocus, LAT.
Safaron, MAL.
Abeer, Kurkam, Kurkoom, Zaifran, PERS.
Acafrao, PORT.
Schafrau RUS.
Kasmira-janma Kunkama. SANS.
Safaroon, MALAY.
Keysur, DUK.
Khoon-gooma poo, TAM.
Khoonkoomapoohoo-TEL.

Crocus sativus, saffron, is a native of Asia Minor, naturalized in England, France, and many other parts of Europe, and cultivated in Persia and Cashmere. The saffron of commerce consists of the dried stigmata of the flower. These are picked out, dried on paper either in a kiln or by the sun. If compressed into cakes it is accordingly called *cake* saffron; *hay* saffron is what is usually met with. The *hay* saffron consists of the stigmas, each about an inch and a half long, brown-red, the upper part flattened, widened, and cleft; the lower, hair-like and yellowish. The odour is fragrant, taste bitter but agreeable. Saffron tinges the saliva yellow. Mr. Pereira informs us that one grain of good saffron contains the stigmata and styles of nine flowers, so that one ounce of saffron, is equal to 4,320 flowers. *Cake* saffron as now met with, contains none of the real article, being prepared from the florets of the safflower (see CARTHAMUS) made into a paste with gum water.—*O'Shaughnessy, p.* 654. Dr. Honigberger, p. 263, mentions that Crocus sativus is monopolized by the Cashmerean government and that the Hakims of the Punjab use saffron in melancholy, typhus fever, enlargement of the liver, and retention of urine. It is now imported into India both from Persia and Cashmere, but into the North western parts of India from the latter only. Dr. Falconer, who visited Cashmere is of opinion that Saffron could be successfully cultivated in the Himalayas, at heights varying from six thousand to six thousand five hundred feet above the sea, and that if it were once brought into the market, the demand for it would be almost unlimited.—*Rhode M.S.S.* Saffron consists of the pistils of the *Crocus sativus*, a bulbous plant, found in various parts of the South of Europe and Asia, and cultivated to a small extent in Cambridgeshire. The pistils are generally dried, and compressed into firm cakes or masses, termed in India *Rootla saffron*; but the finest called *Hay saffron*, consists of the pistils merely dried. When good, saffron has a sweetish, penetrating, diffusive odour; a warm, pungent, bitterish taste; and a rich deep orange colour. It is used in medicine, as a colouring substance, and in domestic cookery. Saffron is brought to India from England, the sea ports of the Red Sea, Persia, and Cashmere.—*Faulkner.* Ainslie tells us that the vytians prescribe this article in nervous affections attended with vertigo, and where there appears to be an approach to apoplexy, by accumulation of blood in the head. They also believe it to possess considerable virtue in Melanchola, Hysteric depressions, and Kistnah Dashum (Typhus Fever), in which last they suppose it to act as a cordial and restorative. To women, soon after the pains of childbirth are over, an infusion of saffron is frequently administered by the Tamool midwives to prevent fever, to support the animal spirits; and gently to assist in carrying off the lochia. This medicine is besides used by the Indian Practitioners as an external application in Ophthalmia when mixed with a small quantity of pounded Kadukai (Chebulic Myrobolan) and lime juice and applied round the eye, but close to it. The Arabians class it amongst their Mosebetal (Hypnotica) Mokewyatdit (Cardiaca) and Mufettehat (Deobstruentia).—*Ainslies' Mat. Med. page* 38. According to Tomlinson, *Saffron* consists of the stigmata of the flowers of a perennial bulbous plant (*Crocus sativus.*), once extensively cultivated at Saffron Walden in Essex, and still fostered in some parts of Cambridgeshire. From this small portion of the flower is obtained a rich yellow-red colour, which, when dried and pure, is of a scarlet hue. Saffron is imported into Britain, from Sicily, France, and Spain, but the foreign product is not so much esteemed as the English. The use of saffron is, however, diminishing. It is employed as a seasoning in cookery: also to colour confectionary, liqueurs, varnishes, and sometimes cheese and butter. It is used to a small extent by painters and dyers. It was formerly much used in medicine as a carminative, antispasmodic and emmenagogue, and it is still occasionally employed to promote the eruption of certain diseases of the skin. On the same principle it is given to birds to assist their moulting. Dr. Lindley describes the colouring ingredient of this plant as "a peculiar principle to which the name of Polychroite has been given; it possesses the properties of being totally destroyed by the action of the solar rays, colouring in small quantity a large body of water, and of forming blue or green tints when treated with sulphuric and nitric acid, or with sulphate of iron. In moderate doses, this substance stimulates the stomach, and in large quantities, excites the vascular system. Moreover it seems to have a specific influence on the cerebro-spinal system, as it affects, it is said, the mental faculties, a result which De Candolle considers analogous to that produced by the petals of certain odorous flowers." Saffron is known in commerce as a kind of fibrous cake. This should be moderately moist, close, tough, and compact, the smell sweet and penetrating, the taste warm, pungent, and somewhat bitter.—*Tomlinson.*

(7290) SAGAPENUM.

Sukbenuj, ARAB.
Sagapenum, FR.
Sagapenummi, GER.
Sugbenuj, GUZ. HIND.
Sagapeno, IT.
Sagafioon, PERS.
Kundel, SANS.

A concrete gum resin, supposed to be a kind of assafœtida (*Ferula Persica*). It is found in masses formed of soft, adhesive fragments, the size of the thumb or more, somewhat transparent; reddish yellow externally, pale within, of a waxy or brittle consistence, often mixed with impurities and seeds. Its odour resembles that of garlic and assafœtida, its taste is hot, nauseous, and rather bitter. It is sometimes adulterated with B'dellium (*Vern*, Googul), and other similar gums. Its medicinal uses are the same as those of assafœtida, but it is considered less energetic, and is but little employed. It is obtained from Smyrna, Alexandria, &c.—*O'Shaughnessy.*

(7291) SAGE. A perennial, native of the South of Europe; it grows in all the gardens and is propagated by seeds, layers, and slips, without any difficulty. It is used for seasoning.

(7292) SAGE, BENGAL.

Murtoo, Beng.

Leaves and herb of Meriandra Bengalensis.—*Ben. p.* 223.

(7293) SAGERETIA, a genus of Plants belonging to the natural order of *Rhamnaceæ*, formed, by M. A. Brongniart, of old species of *Zizyphus* and of *Rhamnus*, and named after M. Sageret, a French vegetable physiologist. The species are found in both South and North America, Java, China, and in India along the foot of the Himalayas. The only species which requires particular notice is *S. ageretia thee'sans* which is remarkable as being employed as a substitute for tea, even in China, where the poor are described by Osbeck as making use of the leaves in the same manner as those of the true tea, and for which it makes a good substitute from its astringency and fragrance.—*Eng. Cyc.*

(7294) SAGIG. The name given by the Bisayas, to a variety of the Manilla Hemp.—*Royle, Fib. Plants.*

(7295) SAGITTARIA SAGITTIFOLIA. The arrowhead, is one of the handsomest of British aquatic plants, whether as regards he elegant spear leaved canes of glossiest green, or the flower spikes rising in pyramidal form from the surface of the water. This plant is extensively cultivated among the Chinese not for its beauty but for the sake of its bulb, which fixes itself in the solid earth below he mud and constitutes an article of food.—*Art Jour. page* 108, *April* 1857.

(7296) SAGO.

Sagu, Bali.
Sagoodana, Beng.
Sekuhme, Chin.
Sagoo, Sagoo-chawl, Guz. Hind.
Sagu, Jav.
Sagu, Mal.
Showarisee, Tam.
Zowbeeum. Tel.

General Remarks—Sago, and starchy matter llied to it,is obtained from many palms. It is contained in the cellular tissue of the stem, and is searated by bruising and elutriation. From the soft tem of *Cycas circinalis*, a kind of sago is producd in the East and West Indies. The finest is, owever, procured from the stems of *Sagus laevis* S *inermis*, of Roxburgh), a native of Borneo nd Sumatra ; and *Arenga saccharifera*, or *Goutus sacchariferus*, of Rumphius. The *Saguerus Rumphii*, or *Metroxylon sagus*, which is found in he Eastern Islands of the Indian Ocean, yields feculent matter. After the starchy substance washed out of the stems of these palms, it is hen granulated so as to form sago. The last-mentioned palm also furnishes a large supply of ugar. Sago as well as sugar, and a kind of alm wine, are procured from *Caryota urens*. In hina, sago is obtained from *Raphis flabelliformis*, a dwarfish palm ; and some sago is made from it for native use in Travancore, Mysore, and Wynaad, in the East Indies.

The trunk of the sago palm, *Metroxylon sagus*. is five or six feet round, and it grows to the height of about 20 feet. It can only be propagated by seed It flourishes best in bogs and swampy marshes ; a good plantation being often a bog, knee deep. The pith producing the sago is seldom of use till the tree is fourteen or fifteen years old ; and the tree does not live longer than thirty years. Mr. Crawfurd says there are four varieties of this palm ; the cultivated, the wild, one distinguished by long spines on the branches, and a fourth destitute of these spines, and called by the natives female sago. This and the cultivated species afford the best farina ; the spiny variety, which has a slender trunk, and the wild tree, yield but an inferior quality of sago.

The farinaceous matter afforded by each plant is very considerable, 500 lbs being a frequent quantity, while 300 lbs. may be taken as the common average produce of each tree. Supposing the plants set at a distance of ten feet apart, an acre would contain 435 trees, which, on coming to maturity in fifteen years, would yield at the before-mentioned rate 120,500 lbs. annually of farinaceous matter. The sago meal, in its raw state, will keep good about a month. The Malays and natives of the Eastern Islands, with whom it forms the chief article of sustenance, partially bake it in earthenware moulds into small hard cakes, which will keep for a considerable time. In Java the word "saga" signifies bread.

The sago palm (*Metroxylon sagus*) is one of the smallest of its tribe, seldom reaching to more than 30 feet in height, and grows only in a region extending west to Celebes and Borneo, north to Mindanao, south to Timor, and east to Papua. Ceram is its chief seat, and there large forests of it are found. The edible farina is the central pith, which varies considerably in different trees, and as to the time required for its attaining proper maturity. It is eaten by the natives in the form of porttage. A farina of an inferior kind is supplied by the Gomuti palm, another tree peculiar to the Eastern Archipelago growing in the valleys of hilly tracts. Perhaps all of these trees contribute to produce the ordinary sagos of commerce, for there are several kinds. Planche, in an excellent memoir on the sagos, has described six species, which he distinguishes by the names of the places from which they come. Preferring to classify them according to their characters, M. Mayet distinguishes only three species. The *first* he denominates.

Uncut sago, which comes from different parts, and varies much in color. It comprehends—1*st*, *Maldivian sago* of Planche, in spherical globules, of two or three millimetres in diameter, translucid, of an unequal pinkish white color, very hard and insipid. 2*nd*. *New Guinea* sago, of Planche, in rather smaller globules, of a bright red color on one side, and white on the other. 3*rd*. *Grey sago of* the Moluccas or brown sago of the English, of unequal globules, from one to three millimetres in diameter, opaque, of a dull grey color on one side, and whitish on the other. This grey color probably raises from long keeping and humidity. 4*th*. *Large grey sago* of the Moluccas, exactly resembling No. 3, only that the globules are from four to eight millimetres in diameter. 5*th*. *Fine white sago* of the Moluccas; entirely resembling No. 3, only that it is purely white, owing to the complete edulcoration of the fecula of which it is made. Whatever may be the places of origin of these sagos, they all possess the following characters—Rounded globules, generally spherical, all isolated, very hard, elastic, and difficult to break or powder. The globules put into water, generally swell to twice their original size, but do not adhere together.

Second sago.—This species corresponds with the pinkish sago of the Moluccas of Planche. It is in very small globules, less regular than those of the "first sago," and sometimes stuck together to the number of two or three. Soaked in water, it swells to double its volume.

Third Sago.—*Tapioca sago.*—This name has been applied to a species of sago now abundant in commerce, because it bears the same relation to the ancient or first sago, and even to the preceding sago, that tapioca bears to "Moussache," which is the fecula of the manioc, *Janipha manihot* (*Manihot utilissima*). Whilst the two preceding species of sago, whatever may have been stated to the contrary, have been neither baked nor submitted to any heating process, as is proved by the perfect state of nearly all their grains of fecula, their species has been subjected to the action of heat while in a state of a moist paste. This sago is not in spherical globules, like the two preceding species, or at least there are but few of the globules of that form; it is rather in the form of very small irregular tubercular masses, formed by the adherence of different numbers of primary globules. The facility with which this sago swells and is divided by water, has occasioned it to be preferred as an article of food to the ancient sago. It has been described by Planche under the name of the white sago of the Moluccas, and by Dr. Pereira under the name of pearl sago.

Bennet, in his work on "Ceylon and its Capabilities," (1843), states that sago is procured from the granulated pith of the talipot palm, *Corypha umbraculifera*.

The *Sagus Rumphii*, Wildenow, and *S. farinifera*, Gaertner.—Before maturity, and previous to the formation of the fruit, the stem consists of a thin hard wall, about two inches thick, and of an enormous volume of tissue (commonly termed the *medulla* or *pith*), from which the farina or sago is obtained. As the fruit forms, the farinaceous medulla disappears, and when the tree attains full maturity, the stem is no more than a hollow shell. Sago occurs in commerce in two states, pulverulent and granulated. 1. The meal or flour is imported in the form of a fine amylaceous powder. It is whitish, with a buffy or reddish tint. Its odor is faint, but somewhat unpleasant and musty. 2. Granulated sago is of two kinds, pearl and common brown. The former occurs in small hard grains, not exceeding in size that of a pin's head, inodorous, and having little taste. They have a brownish or pinkish yellow tint, and are somewhat translucent. By the aid of a solution of chloride of lime they can be bleached, and rendered perfectly white. The dealers, it is said, pay £7 per ton for bleaching it. Common sago occurs in larger grains, about the size of pearl barley, which are brownish white.

Sago is an article of exportation to Europe, and is also shipped to India, principally Bengal, and to China. It is in its granulated form that it is usually sent abroad. The best sago is the produce of Siak, on the north coast of Sumatra. This is of a light brown color, the grains large, and not easily broken. The sago of Borneo is the next in value; it is whiter, but more friable. The produce of the Moluccas, though greatest in quantity, is of the smallest estimation. The cost of granulated sago, from the hands of the grower or producer, was, according to Mr. Crawfurd, only a dollar a picul. It fetches in the London market—common pearl, 20s. to 26s. the cwt., sago flour, 20s. the cwt. The Chinese of Malacca and Singapore have invented a process by which they refine sago, so as to give it a fine pearly lustre, and it is from thence we now principally derive our supplies of this article. The exports from Singapore in 1847 exceeded 6½ million pounds, but are now much larger.

Manufacture.—The following is a description of the manufacture of this important article of commerce—The tree being cut down, the exterior bark is removed, and the heart, or pith of the palm, a soft, white, spongy and mealy substance is gathered; and for the purposes of distant transportation, it is put into conical bags, made of plantain leaves, and neatly tied up. In that state it is called by the Malays *Saugoo tampin*, or bundles of sago; each bundle weighs about 30 lbs. On its arrival at Singapore it is purchased by the Chinese manufacturers of sago, and is thus treated:—Upon being carried to the manufactory, the plantain-leaf covering is removed, and the raw sago, imparting a strong acid odour, is bruised, and is put into large tubs of cold spring water, where it undergoes a process of purification by being stirred, suffered to repose, and again re-stirred in newly-introduced water. When well purified thus, it is taken out of the tubs by means of small vessels; and being mixed with a great deal of water, the liquid is gently poured upon a large and slightly inclined trough, about ten inches in height and width; and in the descent towards the depressed end, the sago is deposited in the bottom of the trough, whilst the water flows into another large tub, where what may remain of sago is finally deposited. As the strata of deposited sago increases in the trough, small pieces of slates are adjusted to its lower end to prevent the escape of the substance. When by this pouring process the trough becomes quite full of sago, it is then removed to make room for a fresh one, whilst the former one is put out into the air, under cover, for a short time; and on its being well dried, the sago within is cut into square pieces and taken out to be thoroughly dried, under cover, to protect it from the sun. It has then lost the acid smell already noticed, and has become quite white. After one day's drying thus, it is taken into what may be called the manufactory, a long shed, open in front and on one side, and closed at the other and in the rear. Here the lumps of sago are broken up, and are reduced into an impalpable flour, which is passed through a sieve. The lumps which are retained by the sieve are put back to be re-bruised, whilst that portion which has passed is collected, and is placed in a long cloth bag, the gathered ends of which, like those of a hammock, are attached to a pole, which pole being suspended to a beam of the building by a rope, one end of it is sharply thrown forward with a particular jerk, by means of which the sago within is shortly granulated very fine, and becomes what is technically termed "pearled." It is then taken out and put into iron vessels, called *quallies*, for the purpose of being dried. These quallies are small elliptical pans, and resemble in form the sugar coppers of the West Indies, and would each hold about five gallons of fluid. They are set a little inclining, and in a range, over a line of furnaces, each one having its own fire. Before putting in the sago to be dried, a cloth, which contains a small quantity of hog's-lard, or some oily substance, is hastily passed into the qually, and the sago is equally quickly put into it, and a Chinese laborer who attends it, commences stirring it with a *pallit*, and thus continues his labour during the few minutes necessary to expel the moisture contained in the substance. Thus each qually, containing about ten pounds of sago, requires the attendance of a man. The sago, on being taken off the fire, is spread out to cool on large tables, after which it is fit to be packed in boxes, or put into bags for shipment; and is known in commerce under the name of "pearl sago." Thus the labor of fifteen or twenty men is required to do that which, with the aid of simple machinery, might be done much better by three or four laborers. A water-wheel would both work a stirring machine and cause an inclined cylinder to revolve over a fire, for the purpose of drying the sago, in the manner used for corn, meal, and flour in America, or for roasting coffee and chicory in England. But the Chinese have no idea of substituting artificial means, when manual ones are obtainable.

Singapore.—A considerable quantity of sago is exported from Singapore in the state of flour. The whole quantity made and exported there exceeds, on the average, 2,500 tons annually. The quantity shipped from this entrepot is shown by the annexed returns, nearly all of which was grown and manufactured in the settlement. The estimated value for export is set down at 14s. per picul of 1¼ cwt.

EXPORTS FROM SINGAPORE.

		Piculs.
1840-41	.. Pearl sago...	41,146
,,	.. Sago flour	33,552
1841-42	.. Pearl sago...	46,225
,,	.. Sago flour	7,447
1842-43	.. Pearl sago...	25,306
,,	.. Sago flour	4,838
1843-44	.. Pearl sago...	14,266
,,	.. Sago flour...	14,067
1844-45	..-Pearl sago	18,472
,,	.. Sago flour...	36,141
1845-46	.. Pearl sago	19,333
,,	.. Sago flour	26,925
1846-47	.. Pearl sago...	40,765
,,	.. Sago flour	9,025

Imports of sago, into the United Kingdom, and quantity retained for home consumption:—

	Imports. Cwts.	Home consumption. Cwts.
1826	9,644	2,565
1830	2,677	3,385
1834	25,763	13,827
1838	18,627	28 396
1842	45,646	50,994
1846	38,595	45,671
1848	65,000	
1849	83,711	72,741
1850	89,884	83,954

—*Simmonds.*

From the above, it will be observed that sago, and the allied starches which receive its name, is now an extensive article of diet, contributing largely to the food of the nursery, the diets of the invalid and the delicacies of the tables of the rich. It is contained in the cellular tissue of the stem of many trees, principally palms, from which it is separated by bruising and washing. In the language of the Papua Islands, Sago signifies bread, and in many countries, this vegetable product constitutes a large part of the food of the people. And the extent to which it has latterly been brought into general use, may be judged of by mentioning that the imports into England have increased from 9,644 cwts. in 1826 to 100,000 cwts. on the average of the four years ending 1852. In commerce, sago is met with in the form of sago meal, and as pearl sago, the latter being the usual form it is seen in Europe from the meal not keeping. In the process of manufacture, the wood is split into billets, the soft interior extracted pounded and thrown into water, the water is then drained off the pulpy mass, when the starch comes away with it, and being allowed to settle, is afterwards prepared and purified by successive washings. This is the "crude" or "raw" "sago," or "sago meal," of commerce. The *Process* employed in manufacturing the pearl Sago, is supposed to have been invented by the Chinese. When the raw Sago has been several times washed and strained through cloth, the masses which collect at the bottom of the vessels are collected, broken into pieces, and placed upon platforms in the sun to dry, being broken into still smaller pieces as the drying proceeds. When sufficiently dry, they are powdered and sifted through sieves made of the midrib of the cocoa nut palm, it is then put into a bag suspended from the roof and granulated by frequent shaking. After this it is dried in iron pans over the fire.

Sources of Sago.—The time for collecting the Sago, is just before the tree flowers, which it generally does when seven or eight years old. The best sago of commerce is obtained from two species of Metroxylon, viz. M. Rumphii, Mart: and M. Jœve, Mart: which inhabit the islands of the Indian Archipelago, and form extensive forests almost exclusively composed of their own kind, these two trees both grow in marshy spots. This is known as the true sago palm. A sago is also produced abundantly from one of the date species, the *Phœnix farinifera*, q. v. The Calamusagus laciniosus, of Griffiths, is supposed also to yield it, but that known as "Mergui sago" is manufactured from the *Tacca pennatifida.* A sago was also exhibited in the Madras Exhibition of 1855, made from the Cycas circinalis. The pith of Caryota urens is much used as *Sago meal,* in Canara when fresh, and deserves attention.—*M. E. J. R.* Sago is obtained in Cochin from a palm called koota pana, and sells there for 2 annas a pound, and in Cochin, the date palm flour and seed is called Eenthalkurroo. Assistant Surgeon J. Pringle, M. D., Civil Surgeon, Cochin, in a letter to the Editor, Cochin, 19th October 1850, sent specimens of Sago manufactured in the immediate neighbourhood of Cochin, the shipping port, as also throughout the country in the vicinity of the backwater, on which there is excellent water carriage to the sea coast. The best sago is made, there, from October to June, as in its preparation bright sunshine is required to mature the operation. The 1st sort may be delivered on the sea coast at Rs. 4½ per maund (25 lbs.), the 2d sort at Rs. 2¼ per maund.—*M. C. C.* Sago is made in Malabar from the pith of the Taliput palm. As with the true Sago palm, a farina is prepared from the medullary matter of the Gomuti, *the Arelenga saccharifera*: in Java, indeed, this palm is the only source of Sago, which is used in considerable quantity in the western and poorer districts of the island and is offered for sale in all the markets. It is smaller in quantity than in the pith of the true Sago-tree, more difficult to extract and inferior in quality: possessing a certain peculiar flavour from which the farina of the true Sago is free. Some trees will produce five or six female spadices, before yielding a single male one, such trees are considered unprofitable by the toddy collectors, but in this case, it is said that they yield Sago equal in quality, though not in quantity, to the Cycas circinalis, from which, both in the East and West Indies a kind of Sago is procured. One tree yielded about 150 lbs. of good Sago meal. The pith or farinaceous part of the trunk of old trees, of the Caryota urens or kittul palm is manufactured into Sago, equal to the best farina, being highly nutritious: It is said, indeed, to be equal to that of the true Sago palm. In China, Sago is obtained from Raphis flabelliformis, one of dwarfish genus of palms, a native of the island of Liu-kiu and Southern China, and, also, on the authority of Simmonds p. 314, in Travancore, Mysore, and the Wynaad. A farina is prepared in Brazil from the inside of the trunk of the "Carnauba," *Copernica cerifera,* of the Brazilians. The pithy portion of the trunk of the Gebang palm, *Corypha Gebanga,* Blume, yields a sort of Sago, as also that of the Sabal Adansonii, and the Sago palm of New Ireland.

The Cycas circinalis before alluded to, belongs to the *Cycadaceæ*, a tribe of plants possessing nearly equal affinity with palms and tree ferns. Its genera are natives of the tropics and the temperate parts of America and Asia, all of them contain a starch and it is separated from the pith of many and employed as an article of diet. *The Encephalartos* is called "Caffir Bread." The seeds of *Dion edule*, in Mexico, yield starch and in the Bahamas and other West Indian Islands, a Sago is obtained from a species of Zamia. In the Moluccas, from *Cycas Circinalis,* and in Japan from C. revoluta.—*Seeman.*

"*Ipuruma,*" is the Guiana name given to a Sago like flour formed from the medullary portion of the trunk of the *Mauritia flexuosa.* It was tried by Humboldt, who described it as very agreeable to the taste, resembling rather Cassava Bread, than the sago of India. It is said to yield its sago in most abundance if the male tree be cut down just before the flowers appear. The "red" or netted hammock of the native tribes of the Amazon, are made from string manufactured from the dried leaves of this plant.

The " Papunha," *Guilielma* species, of Brazil produces a farinaceous fruit. In various countries of Europe, millet, *Panicum muliaceum* and *P. frumentaceum* is used as a substitute for sago and is considered excellent.—*Seeman. Simmonds.*

Sago of Mergui, Sago may be seen in every bazar in the Tenasserim Provinces, but it is not generally known what plant produces it, many having the erroneous impression that it is made from manihot. It is the produce of an indigenous plant abounding along the sea shores, the slands, and especially at Mergui—a species of acca, the same plant that is common in the South Sea Islands, whose tubers there supply to he inhabitants the place of bread. Considerable quantities of sago are made at Mergui, yet Lindley in his Medical Botany, makes no eference to tacca as yielding sago.—*Mason.*

Archipelago.—Crawfurd tells us that in the *Eastern Archipelago*, there are supposed to e five palms producing this article, of which he most frequently cultivated are the *Me- roxylon sago*, Syn. *Sagus konigii*, *Rambaya* Malay: and the *Sagus lævis*, *Bamban*, Malay. ago trees are found in every part of the Malayan Archipelago and Philippines, as far s Mindano, wherever there is a genial soil r them, and this soil consists of a marsh or og, composed of decayed land and vegetables, ear the sea but excluding tidal action. They re most abundant in the eastern parts of the Malay Archipelago at the Moluccas and neigh- ouring islands, with New Guinea and Borneo, nd, in the Philippines, Mindano. All these lms yield an immense quantity of farina, e wood being a mere shell containing a ass of medulla, and the Sago from them more or less the food of the inhabitants the Archipelago. The Sagos propagate lateral shoots, as well as by seeds, and only roduce fruit once, after which they die. From e first of their properties, a sago plantation nce formed is perpetual. The trees are culti- ted in small patches, and a man and s family can manage a plantation of about 0 trees, in a space of 100 square fathoms. e trees are cut down immediately before bear- g fruit, which is usual about the age of 15 ars. When a plantation has once arrived at aturity there will be a constant harvest. The go tree when cut down and the top severed m it, is a cylinder about 20 inches in dia- eter and from 15 to 20 feet in height. Assum- g this to be the average, the contents will be arly 26 bushels, and allowing one half for ody fibre, there will remain 13 bushels starch, which will give about 700 pounds for ch tree, or 12½ bushels. It may give some idea of the enormous rate of this produce, if it be considered that three trees yield more nutritive matter than an acre of wheat and six trees yield more than an acre of potatoes. An acre of sago, if cut down at one harvest, will yield 5220 bushels, or as much as 163 acres of wheat, so that according as we allow 7 or 15 years for the growth of a tree, an acre of sago is equal in annual produce to 23 or to 10 acres of wheat. Up till 1814 the Archipelago used to export small quantities of the granulated form of Sago, of a dirty brown colour, but about the time when the trade with Europe was first thrown open, the Chinese of Malacca began to prepare a much superior article known in commerce under the name of pearl sago. Of this and sago flour, or the ungranulated starch, Singapore is at present the chief place of manufacture and principal mart, the Chinese being the sole manufacturers, and the raw material being brought from various neighbouring countries, but chiefly from the north-western coast of Borneo and the north Eastern of Sumatra, with its adjacent islands from Siak to Jurdagiri In the year 1847-48, the quantity of Sago exported from Singapore was about 80,000 cwt, worth on the spot about £45,000.—*Crawfurd, p.* 372.

China.—Sago is brought to China to some extent in native vessels and is said to be the produce of the *Metroxylon sagus*, a species of palm, about 30 feet high and 18 inches in diameter. But it is not fit to make sago from until it has attained maturity, at which time the trunk is hollow. This tree grows in Sumatra and on the western side of Borneo. When cut down, the medullary part of the trunk is scraped out and reduced to powder, and the filaments separated by washing. The meal is cooked by baking. It is made ready for sale by the natives by sewing the leaves of the tree into a sort of bag, seven of which are about equal to a pecul; all the sago tamping, as these bags are called, is brought to Singapore, where the Chinese have manufactories for refining and granulating it. This is done by mixing it with pure water, and rubbing the paste into little grains. When well cured, it has a pearly lustre, is slightly reddish and dissolves in hot water into a fine jelly. There are numerous manufactories in Singapore for making sago, from whence many thousands of peculs are annually exported, principally to England. Its price in China is $ 3 to $ 4 per pecul —*Morrison.*

(7297) SAGUS, OR SAGUERUS, a genus of Plants belonging to the family of Palms. The leaves are pinnated; the flowers monœcious; the spadix branched, without any common spathe, but with numerous partial ones; the fruit hard, shining, its surface divided into numerous rhomboidal spaces. The species are natives of the islands of the Indian Archipelago, and yield sago.—*Eng. Cyc.*

(7298) SAGUS LÆVIS. Sago Tree.

Rambiya, Malay.

This is a native of Sumatra and the Moluccas. The stem is as thick as that of the cocoa-nut tree, which is from 15 to 20 years in attaining maturity.—*O'Shaughnessy, page* 640. Sagus, lævis, the True Sago-Palm, has the petioles and spathes unarmed. This palm furnishes most of the sago sent to Europe.—*Eng. Cyc.*

(7299) SAGUS RUMPHII. Sagus Rumphii, *Willd.* E. the *Sagus spinosus* of Rumph. Herb. Amb. i. p. 75, has the petioles and spathes guarded by strong prickles. According to Martin, the sago yielded by this plant is used principally in India, and seldom exported.—*Eng. Cyc.* It is made officinal in the London Pharmacopæia as the plant yielding Sago, which is described as *Medullæ Fæcula*; but Endogens have no proper pith. In that of Edinburgh it is said to be the Farina from the interior of the trunk of various Palms and species of Cycas. The Malays are said to prefer the Sago of this tree(*Sagus Rumphii*). Dr. Roxburgh states that the granulated Sago is made from sagus (*inermis* Roxb.) *lævis*, Jack. Blume states it to be produced by *Sagus lævis* and *S. genuina*. The *Saguerus saccharifer* also, (called likewise *S. Rumphii* and *Arenga saccharifera*,) when exhausted of its saccharine sap, yields Sago of good quality. *Caryotaurens* and *Phœnix farinifera* also yield a Sagolike farina in India. It is, therefore, difficult to select one as the sole officinal species. Sago is also said to be produced by species of Cycas, but the statement has never been properly confirmed. Some *Zamias* are said to yield one kind of Arrowroot in the West Indies. M. Planche has arranged the Sagos of commerce under six different heads, according to the places whence they are procured. M. Guibourt arranges them all under three heads. 1. Uncut Sago. 2. Seed Sago. 3. Tapioca Sago, which is the same as Pearl Sago. The unbroken grains of Sago, are more or less of an ovoid form, but most appear as if truncated or muller-shaped. An imitation of Sago is made with Potato-Starch near Paris. *Royle.* Sago is insoluble in cold water, but by long boiling becomes soft. *Saguerus* saccharifer, (Syn. Arenga saccharifera), is scarce, and only found in some of the gardens in Bombay, where it has been introduced from the Sumatra Islands. It is only grown as an exotic, and is a very beautiful species of palm, from its pinnate leaves. It is propagated by suckers from the roots of the old tree.—*Riddell.*

(7300) SAHCOTTAY OIL. From Canara, used for cutaneous diseases.—*M. E. J. R.* 1857.

(7301) SAILING FISH. Inquiries were made about two remarkable inhabitants of the waters about Malacca and Sumatra, described by Raffles; the sailing fish, called by the natives ikan layer, and the dugong, mentioned by Valentien, and so long talked of as the mermaid, but the Commodore was told by the inhabitants of Singapore that these fish had become very scarce, if not entirely extinct.—*American Expedition to Japan, p.* 155.

(7302) SAIL-LEAF. Pandanus.—On many of the Burmese boats, sails are seen made of large narrow leaves, sewed together. They are the leaves of a species of screw pine, that has a trunk like a palm, which usually grows near the sea, and is very abundant. The fruit is used by the Karens, to hackle their thread.—*Mason.*

(7303) SAKI. A pair of chop sticks was placed at each corner of every table, in the centre was an earthern pot filled with *saki* (the intoxicating drink made by the Lew Chewans) surrounded with four acorn cups, four large-coarse China cups with clumsy spoons of the same material and four tea cups of tea. Cups of tea were first handed round, these were followed by very small cups of saki, which had the taste of French liqueur.—*American Expedition to Japan, p.* 218.

(7304) SAL, or SAUL, an East Indian timber-tree, the Shorea robusta; (See 377, Dr. Wallich's Catalogue): this wood is in very general use in India for beams, rafters, and various building purposes; Saul is close-grained and heavy, of a light brown colour, not so durable but stronger and tougher than teak, and is one of the best timber-trees of India. Captain Baker considers saul to resist strains, howsoever applied, better than any other Indian timber: he says the Morung Saul is the best. The Sissoo appears to be the next in esteem, and then the teak, in respect to strength.—*Tred.*

(7305) SAL AMMONIAC, Muriate of Ammonia, Hydrochlorate of Ammonia.

Urmeua, Arab.
Vayvagarra loonoo, Cyng.
Sel Ammoniac, Fr.
Salmaik, Ger.
Nowsagur Nowsadur, Guz. Hind.

Sale Ammoniaco It.
Sal Ammoniac, Lat.
Nowshadur, Pers.
Naschatur, Rus.
Nowsadur, Sans.
Navacharum, Tam.

Is prepared by the decomposition of the ammoniacal fluid given off during the preparation o coal gas; also, by a complicated process fron bones, camel's dung, and other refuse of anima substances containing its ingredients. It is likewise found native at Etna and Vesuvius, i some of the Tuscan lakes, and in Persia, Bokhara, &c. It is met with in large cakes of semicircular form, translucent, and colourless with a sharp, saline, cool taste, but no smell It is extensively employed in the arts, in the preparation of aqua-regia, in soldering some of the metals, in tinning iron and copper, in the preparation of dyes, liquid ammonia, and in various chemical manufactures. It is brought to Bombay from Calcutta, and is re-exported to the Persian and Arabian Gulfs.—*Faulkner.* Sa ammoniac, is collected in Mongolia and Ile fron lakes and the vicinity of extinct volcanoes, anc blue and white vitriol, which are obtained by roasting pyrites.—*Williams' Mid. King. p.* 248. *Sal Ammoniac* is a compound of ammonia and hydrochloric acid, NH_3, H. C.$_1$, now called *hydrochlora te of ammonia*, although the older term, *muriate of ammonia*, is also used. The substance from which this salt was first obtained, was the soot of camel's dung; and it was formerly produced therefrom by sublimation in large quantities, in Egypt, near the temple of Jupiter Ammon, whence the name *sal ammoniac.* It is now manufactured largely in Europe. by combining hydrochloric acid either directly or indirectly with ammonia obtained from the decomposition of animal matter. In France, bones and other animal matters are distilled in large iron retorts, for the manufacture both of animal charcoal and of sal ammoniac. Coal soot was formerly used in Great Britain as a source of this salt; but since the establishment of gas works, it has been chiefly derived from the liquor obtained during the preparation of coal gas. (See Gas.) The impure carbonate of ammonia contained in this liquor is either at once saturated with hydrochloric acid, or it is first converted into sulphate of ammonia and afterwards by decomposing it with common salt into hydrochlorate; the products being sulphate of soda and hydrochlorate of ammonia; the atter is separated by crystallization and sublimaion. This salt, as obtained by sublimation. s amorphous, somewhat elastic, translucent, and colourless; and of the sp. gr. 7·45 to 1·50, but when obtained by crystalization, its form is octohedral and cubic. Its taste is sharp and aline: it has no smell; it dissolved readily in water; it does not change in dry air,and volatilizes by heat, without undergoing decomposition. It is ecomposed by lime, and the fixed alkalies, with he evolution of ammoniacal gas: sulphuric acid xpels hydrochloric acid gas from it. Sal ammoniac is used in the arts for a variety of purposes; as in pharmacy for making ammoniacal reparations: in tinning, to prevent the oxidation f the surface of the copper: when dissolved in itric acid it forms the *aqua regia* of commerce, sed for dissolving gold instead of nitro-hydroloric acid. It is also used in small quantities in eam boilers, to prevent the formation of calcaeous deposits.—*Tomlinson.*

(7306) SAL PRUNELLA, a term applied to trate of potash, fused and cast into balls resembing prunes or plums, and sometimes coloured resemble them.—*Tomlinson.*

(7307) SALACIA, a genus of Plants belongg to the natural order *Hippocrateaceæ*, which s been so differently defined by different bonists, that it sometimes includes species found Asia, Africa, and America. At other times, merican species are referred to the genus *Tonlla*, and the African species to the genus *alypso*, and those of India to the genus *Johnia*, the last named in compliment to Dr. John, a Danish missionary, who was one of the founders of the Botanic Garden at Tranquebar, and sent many new plants to Dr. Roxburgh. The whole are formed of species which have little beauty, but the fruit of both the species of *Johnia* is eatable.—*Eng. Cyc.* Wight gives Salacia macrosperma, 962; multiflora, 962; oblonga.; pomifera, 55; prinoides, 321; and verrucosa, 662.

(7308) SALEP. ORCHIS MASCULA. -Lin.

Salib misri, Arab & Duk.	Salamisrie, Tam.
Salep, Fr.	Salep Misree, Guz.
Salem Misree, Tam.	Hind. Pers.

The tubers of the *Orchis mascula* receive this name in works on pharmacy. They are compressed, ovoid, rather transparent, and composed chiefly of bassorine, soluble gum, and starch. Royle states that one drachm of the powdered root requires 60 drachms of boiling water to affect its solution; two drachms afford a sufficient meal for an invalid; good salep carefully prepared is in truth one of the best articles of diet a convalescent can use. In India the salep of Cashmere is reckoned the best, and is obtained chiefly at the Hurdwar fair from the Cashmere merchants. Lindley and Royle consider the plant which produces this salep to be an *Eulophia* not an *Orchis.* This substance, from the peculiar shape of the tubera, has gained immense, but most unmerited celebrity as an aphrodisiac remedy. The same circumstance has given the plant its name both in the Greek and Arabic language.—*O' Shaughnessy, page* 653. At the Madras Exhibition of 1855, there were three samples of "Salep misree" contributed by Dr. Riddell—"one" and "two", labelled "Salep misree" from the Kunner Hills near Aurungabad—sold when green, and fresh dug up, at 2 pice per seer: "three" was from Booldanah Hills in Berar—when fresh dug is sold by the bheels at 12 seers for the Rupee. These small dried tubers of terrestrial orchids were hard, and had a horny appearance, the two first were dirty green and the third of a yellowish white color. The Salep contains a gummy principle (Basscrine) beside the large proportion of amylaceous matter, which renders it highly nutritious as a diet for invalids. Dr. Riddell's price is considerably lower than that in the bazar of Madras.—*M. E. J. R.* Although that imported from the Persian Gulf is also much esteemed, and is the sort generally met with, salep is indigenous in some parts of the Western Presidency, but for want of cultivation, the tubers are scarcely worth the trouble of procuring.—*Faulkner.* Native practitioners consider Salep as a powerful strengthener of the body, and prescribe it in conjunction with mastich and some other ingredients, in such cases as require tonics.—*Ains. Mat. Med. p.* 40. This nutritive mucilagin-

-ous substance is obtained from the subterraneous succulent roots of several species of orchis, especially *Orchis mascula*, thus forming one of the few exceptions to the general rule, that orchidaceous plants, which charm and astonish by their elegant, varied, or grotesque forms are without known utility to man. Salep is a powder prepared from their dried roots; in some cases, as in that imported from India, it is in hard clear pellucid inodorous pieces. There is not much demand for this substance, although it is considered a bland and nutritious article of diet, taken with milk, in the same way as arrowroot. The orchis which yields it thrives well in England, but is not cultivated to any extent.—*Tomlinson.*

(7309) SALICINE, a peculiar, crystallizable, bitter principle, obtained from the leaves and young bark of the poplar, willow, aspen, &c. It forms small white silky needles, and in some respects, resembles the vegeta-alkalis, cinchona, and quina, having febrifuge properties; but it differs from them in containing no nitrogen, and not forming salts with acids. Its formula is said to be $C_{26}H_{18}O_{14}$.—*Tomlinson.*

(7310) SALICORNIA. Of this genus, Wight gives, in Icones, Salicornia brachiata, 738; *fruticosa*, 738; *herbacea*, 738; and Indica, 737.

(7311) SALICORNIA INDICA.

Jidoo Palung, Beng.

A plant very common on such salt grounds as are inundated by the spring tides. It is especially plentiful on the coast of Coromandel, and would doubtless yield a fine and cheap carbonate of soda. But the probable value of this article as an Indian export has been much depreciated by the progress of chemical science in Europe. The purest alkali is now manufactured in England by decomposing common salt by sulphuric acid, and at the low rate of 10*l.* the ton of 30 maunds.—*Eng. Cyc.*

(7312) SALISBURIA, a genus of Plants belonging to the natural order *Taxaceæ*, named in honour of R. A. Salisbury, a modern botanist of distinction. The tree, which is the only one of the genus, has long been known by the Japanese name Gingko. The genus is characterised by having monœcious flowers. The male flowers disposed in a filiform naked catkin, without calyx or corolla; stamens numerous; the anthers composed of 2 cells, which are pendulous, and united only at the apex. Female flowers solitary and terminal; calyx 4-fid, or rather a cup-shaped disc, from the thickened apex of the peduncle, surrounds the base of the solitary ovule; fruit forming a drupe, which has its base supported by a fleshy cup, with a juicy white pulp; seed nut-like, with an osseous shell; kernel white; embryo axillary, dicotyledonous, radicle above.—*Eng. Cyc.*

(7313) SALISBURIA ADIANTIFOLIA, the Gingko, grows naturally in Japan, is much cultivated in China, and is found in many gardens in Europe. Fine old specimens may be seen at Kew and in the Apothecaries' Garden at Chelsea. In congenial climates it attains the size of the walnut. It is remarkable for the form of its leaves, which are wedge or fan-shaped, deeply cut in the centre or bilobed, and finely striated with veins, having some resemblance to the leaves of some species of *Adiantum*, whence it is commonly called Maiden-Hair Tree in England. The pulp of the fruit is austere tasted, but the kernel is sweet, with some degree of bitterness when raw, but agreeable as a dessert when roasted like chestnuts. They are much eaten in China. Dr. Abel says he saw the fruit exposed in the markets in China, but could not find out to what purpose it was applied.—*Eng. Cyc.* In one of his journey's, here and there, on his way Mr. Fortune met with large trees of the *Salisburia adiantifolia*, which are the largest and most striking trees in some parts of the country, —*Fortune's Wanderings, page* 248; In the following page, he says that the only tree which he met with of very large size in this district is the Salisburia adiantifolia, commonly called the Maiden-hair tree from the resemblance its leaves bear to a fern of that name. This is one of the plants which the Chinese are fond of dwarfing, and it is, consequently, often seen in that state in their gardens. Its fruit is sold in the markets in all Chinese towns by the name of "Pa-Hwo", and is not unlike dried almonds, only whiter, fuller, and more round. The natives seem very fond of it, although it is rarely eaten by Europeans. The weeping willow, apparently the same species as we possess in England, is also common on the sides of all the rivers and canals, as well as in the gardens of the Chinese; and there is also a species of elm but it never attains any great size and can therefore be of little value.—*Fortune's Wandering, page* 129.

(7314) SALIX. Of this genus, Wight, in Icones, gives Salix ichnostachya, 1963; and tetrasperma, 1954. Dr. O'Shaughnessy carefully examined Salix Tetrasperma, the only willow found in lower Bengal, but could not detect in it any trace of salicine. *Salix babylonica* and *Ægyptioaca*, (Khilaf bhulkee, *Arab.* Bed mooshk *Pers.*) occur in gardens in Upper India. Salix Lindleyana, or dwarf willow, occurs at 12,000 to 13,000 feet on the Himalayas—S. chita and rotundifolia in Kunawur; a kind of manna, *bedkisht*, is said to be collected from the willows in Khorasan.—(*Royle*)—*O'Shaughnessy, page* 606.

(7315) SALIX ÆGYPTIACA.

Bed-e-musk. Pers.

Is cultivated at Lahore for the distillation of an aromatic water, prepared from the palms of this kind of willow, which is much used in the hot season.—*Thirty-five years in the East by Dr. Honig. See. Vol.* 1. *p.* 165. *p.* 339.

(7316) SÁLIX BABYLONICA. WEEPING WILLOW.

Bet Mujnee Khilaf bhulkee, Seilee Mujnoo, HIND.

Mujnoo is cultivated in gardens at Ajmeer.—*Genl. Med. Top. p.* 210.

(7317) SALIX TETRASPERMA. A peculiar species of willow is common at Rangamally in he Terai which is a singular fact, as the genus s characteristic of cold and arctic latitudes, nd no species is found below 8000 feet elevaion on the Sikkim mountains, where it grows n the inner Himalaya only, some kinds ascending to 16,000 feet.—*Hooker. Him. Jour. Vol.* . *page* 400.

(7318) SALMALIA MALABARICA. SYN. BOMBAX MALABARICUM: also SALMALIA INIGNIS. Red Cotton tree.

Poola marum, TAM. | Booraga, TEL.
Moollelavoo, CAN.

A large common tree, flowers of a beautiful ed colour, the wood light, and spongy used by Moochees in their work, but very inferior.—*M. E, J. R.* Salmalia Malabarica is common bout Nelambore where it is used for building.—*McIvor.* In Tenasserim, the red cotton tree is ne of the most abundant forest trees, and the lky down that envelopes the seed is used to uff mattresses and pillows and has occasionly been made into cloth. There appear to be wo species, but I can refer to the description of ne only.—*Mason.*

(7319) SALPIGLOSSIS. SCROPULARINEÆ. his genus of showy plants require much care their cultivation, the situation in which they e grown should be sheltered and partially aded, for if exposed to the sun they become ithered and die suddenly, the colours are pure, red, white, and variegated. When grown pots, it should be frequently shifted into pots, ly a little larger than the previous ones, so to make the plants bushy, the soil should be am mixed with sand.—*Riddell*

(7320) SAL PRUNELLA. A term applied cakes or balls composed of fused saltpetre.

(7321) SALSOLA, a genus of plants belongg to the natural order *Chenopdiaceæ*, so named om 'salsus,' salt, in consequence of many of the ecies yielding kelp and barilla. The species e chiefly found on the sea-shore in temperate rts of the world, and also in hot parts of the orld where the soil is saline, or where there is lt water in the vicinity. The genus is charterised by having perfect flowers; the perianth cleft, persistent, enveloping the fruit with s base, and crowning it with its enlarged ariose limb; stamens 5; styles 2; embryo iral; herbs or small shrubs, smooth or pubescent; leaves alternate or opposite, roundish, seldom flat; flowers axillary and sessile.—*Eng. Cyc.*

(7322) SALSOLA INDICA.

Ella-kura, TEL.; Oomarie-keeray, TAM.

This with Salicorneæ, and others, are natives of the salt marshes and grounds near the sea, flowering the greater part of the year. The green leaves are universally eaten by all classes of natives who live near the sea, and are reckoned very wholesome. The leaves of this plant alone saved many thousand lives during the famine of 1791-2-3. *Roxb.* vol. ii. p, 63.—*O'Shaughnessy, page* 525. A small procumbent weed, with linear shaped leaves used as greens, a very pleasant vegetable.—*Jaffrey.*

(7323) SALSOLA KALI, Saltwort, so named from yielding barilla or kali, that is, alkali, is found on the coasts of Europe, and of many parts of the world, and is one of the species which is burnt for the purpose of yielding kelp and barilla.—*Eng. Cyc.* The *Salsola Kali* of Europe, and the colder parts of Asia, is mostly found on sandy shores, or arid deserts; an annual bushy plant, with stiff thorny channelled leaves. The dried plant, when reduced to ashes, yields 25 to 30 per cent. of carbonate of soda.—*O'Shaughnessy, page* 526.

(7324) SALSOLA NUDIFLORA.

Rawacada, TEL.

Is a native of salt barren lands near the sea, and flowers during the greater part of the year. The stems are perennial, many-spreading, close upon the ground, and often striking root, ramous, extremities of the branches ascending. The plant is only used for fuel, but Roxburgh believes it would doubtless yield excellent soda.—*O'Shaughnessy, page* 525. Dr. Roxburgh describes *Salsola nudiflora* as a native of salt barren lands near the sea in India, where it is gathered for fuel only; but as the taste is strongly saline, it would no doubt yield good fossil alkali; and he gave it as his opinion that this plant, with two Indian species of *Salicornia,* might be made to yield barilla sufficient to make soap and glass for the whole world.—*Eng. Cyc.*

(7325) SALSOLA SATIVA is a species found on the southern coast of Spain, where some pains are taken to extend both it and the following species by cultivation, for the purpose of yielding barilla when burnt. The crop is cut in September, and laid in small heaps to dry. These heaps are collected and burnt, forty or fifty of them, in a hole in the ground. The *Salsola sativa* of Spain is equal to last species.

(7326) SALSOLA SODA is found on the southern coast of Europe, and in the north of Africa. Merat and Delens conceive that the species which yields the soda of Alicant is a new species, and not yet described, which they propose calling *S. Berit.* Other species are described by Forskal as yielding soda on the coasts of the Red Sea.

(7327) SALSOLA SPINESCENS.—*Wight* 1795.

(7328) SALT, Muriate of Soda, Chloride of Sodium.

Melh, Arab.
Uyah, Bali.
Yen, Chin.
Loonoo, Cyng.
Zout, Dut.
Sel, Fr.
Salz, Ger.
Nemuk, Guz. Hind.
Sale, It.
Uyah, Jav.
Sal, Lat.
Gharam, Mal.
Meet, Mah.
Nun, Shora, Pers.
Sal, Port.
Sol, Rus.
Lavana, Sans.
Sal. Sp.
Ooppoo, Tam.
Lawanum, Tel.

Well known as a seasoner and preserver of food from the earliest ages. Two kinds are distinguished, *Rock* and *Sea* salt. When found native in immense masses, which only requires to be dug and reduced to powder, it is termed rock salt; and when obtained by the evaporation of sea-water, common or sea-salt. Sea-salt is extensively manufactured on the Sea-Coast of Madras and is exported in great quantities to the Malabar Coast, Calcutta, Penang, &c.—*Faulkner.* It is manufactured on account of the Indian Government at many places along the coast: the process is not everywhere exactly the same, but generally the sea water being raised by means of packottas is run into shallow beds or pans and evaporated: additional water being added as the evaporation goes on. The salt is raked to the side and conveyed to platforms or raised places where the salt is heaped in quantities of ten or more garce. In some places, a proportion of the salt water is obtained from wells dug near salt creaks; in others the salt water is dammed up in the mouths of rivers, where it is partially evaporated for sometime before being run into the pans. In Bengal the sea water is generally evaporated by boiling.—*Rohde M. S. S.* At the Madras Exhibition of 1855, there were fourteen specimens of common *Salt* exhibited. In one locality, the Salt formed on an extensive plain to the South after the evaporation of the water driven on by the South winds, is very white, the crystals remarkably perfect and of a large size. The Salt of the Vizagapatam coast is particularly fine. That of Vizagapatam is inferior, but at Nowpada the crystals are large and pure, and so hard do they become when stored, that, according to the officers of the Salt department, sparks of fire are elicited from the old heaps, when they are broken up for sale with a crowbar.—*M. C. C.*

(7329) SALTPETRE, Nitrate of Potash. Nitre. *Prismatic nitre.*

Ubkir, Arab.
Wedie Loonoo, Cyng.
Sandawa, Mesiumentah, Mal.
Salpeter, Dut.
Nitre, Fr.
Salpeter, Ger.
Sooriakhar Guz. H.
Nitro, It.
Nitrum. Potasse Nitras, Sal Petrae, Lat.
Shora, Pers.
Nitro, Port.
Senitra, Rus.
Yava kshra, Sans.
Nitro Salitre, Sp.
Potti-loopoo, Tam. & Tel.

A salt composed of nitric acid and potash. It may be regarded both as a natural and artificial product; being found on the surface of the soil in many parts of India, Egypt, Italy, &c. But in these and other places, all that is known in commerce is obtained by an artificial process, or by lixiviating earth that has been formed into nitre beds. From Bengal and Madras, saltpetre has been largely shipped to England; and of late years it has also formed an article of export from Bombay to England and the Continent. It is used for making gunpowder, signal-lights, nitric and sulphuric acids, in metallurgy, dyeing, and medicine. *Faulkner.*—At the Madras Exhibition of 1855, eight good samples were exhibited, the jury considered that exhibited by Mr. Ouchterlony to be the best, and awarded to him a 2d Class Medal—the next and almost equally good, being that of Mr. J. Rundall, Razole, Rajahmundry—to whom the jury awarded honorable mention. The specimens of commercial Saltpetre examined in Madras have, generally speaking, been very pure, and especially free from "*Sulphates.*" Saltpetre in Southern India, is made at Moganore and Errode. Saltpetre of a very fine quality is made at Ellore. The native name of the town is *Oopoo Ellore*, shewing that it has long been famous for this mineral at 1 Rupee the maund. very good, but they produce a twice boiled Saltpetre at 2 Rupees which is very superior. Saltpetre is found in some of the caves of Tenasserim and is imported from Rangoon.—*Mason.* Marsden referring to the saltpetre caverns in the country of *Callown* near the land of the *Davi* river, in Sumatra Researches, states that these caves are filled with nests of innumerable birds of the swallow kind which abound the more the further one advanced into the cave and that it was their dung forming the soi (in many places from four to six and even from fifteen to twenty feet deep) which affords th nitre. A cubic foot of this earth produced on boiling 7 pounds 14 ounces of Saltpetre and further experiment gave one ninth more.—*Rohde M. S. S.* See Potash, Nitrate of.

(7330) SALVADORA INDICA. Royle, p 319.

Jal, Hind.
Irak, also Miswak, Per.

Mahomedan tooth brush tree; leaves, *Rasun* Found on the banks of the Jumna, and from Dell to Saharunpore. The leaves resemble the lanceo late senna, and are also purgative; the fruit i called *Peel* and *Pinjood*, and is said to be eatable. It is not known whether the root bar possesses the same acrid properties as in th succeeding species. We deem both the plants highly deserving of further investigation.—*O'Shaughnessy, page* 527. *Salvadora Indica*—the tooth brush tree, grows also in the Punjab. The leaves, *Rasuna* resemble the lanceolate senna, and are purgative; the fruit is called *Peel* and *Pinjood*. The twigs of this tree are used as tooth-brushes.—*Thirty five years in the East, by Dr. Honig. p.* 339.

(7331) SALVADORA PERSICA. *Syn.* CISSUS ARBOREA, *Forskal.* Persian Salvadora.

Piloo-Kurjal, HIND.

Salvadora Persica, the Mustard-Tree of Serip- ure, has a succulent fruit with an aromatic smell, nd tastes like garden cress. The bark of the oot is extremely acrid; bruised and applied to he skin, it soon raises blisters, for which the atives of India often use it.—*Eng. Cyc.* It rows in most parts of the Circars of India, lso in Arabia, and the Persian Gulf. Thrives ell in every soil, and is in flower and ruit all the year round. Trunk generally rooked, from eight to ten feet high to he branches, and one foot in diameter. The ark of the root is very acrid, and if applied o the skin soon raises blisters; it promises to be stimulant of very great power.—(*Roxb.*) It s supposed to be the mustard tree of Scripture *Lind.*); a decoction of the bark of the stem is aid to be tonic, and the red berries eatable. —*O'Shaughnessy, page* 526. It is a very ommon tree in Ajmeer and Marwar. The right green of the leaves is very refreshing the eye, as the tree grows in very barren laces; it is generally semi recumbent on the round, and affords little shade. The leaves d bark are very acrid, smelling very strongly f cresses; the freshly pounded bark of the oot is an active epispastic and though not known s such to the natives of Ajmeer, Dr. Irvine nployed it successfully.—*Irvine.* An ex- llent solid oil, of a bright green color, is ob- ined from Bombay, having a consistence termediate between that of tallow and wax, sible at about 95 degrees, and easily bleached. has a peculiar and somewhat aromatic odour. here is some uncertainty as to the plant from hich it is obtained. It was referred to the Sal- dora persica, and to the Vernonia Anthel- intica, a plant common in Guzerat and the oncan Ghats.—*Simmonds.*

(7332) SALVADORACEÆ, a natural order Monopetalous Exogenous Plants, comprising ly one genus, *Salvadora.* It is characterised possessing a superior ovary, regular flowers, ngle carpel, single style with a simple stigma, d a 1-celled fruit with a single seed. The posi- on of the genus *Salvadora* has always been oubtful: by one author it has been referred to *henopodiaceæ*, although it has a monopetalous orolla; by others it is referred to *Myrsinaceæ*, om which it differs in the position of its stamens and the structure of the ovary and seeds. It is most nearly allied to *Plumbaginaceæ* and *Plantaginaceæ*; with the former it agrees in habit, and with the latter in the number of the parts of the flower, its membranous corolla, and simple style. They are Indian and north African plants, with eatable fruit.—*Eng. Cyc.*

(7333) SALVIA. There are very numerous species of this genus, which correspond very closely in their properties; one, the *S. amarissima* is excessively bitter.—*O'Shaughnessy, page* 488.

(7334) SALVIA BENGALENSIS. BENGAL. SAGE. Roxb. Fl. Ind. i, p. 146.

(Murtoo) BENG *Meriandra bengalensis* (Bentham). Common in Bengal and Coromandel, much stronger than the officinal sage,—a straggling shrub with a trunk often as thick as a man's arm.—*O'Sh. p.* 488. It is cultivated in European gardens at Ajmeer: the Hindoos think this a very impure plant.

(7335) SALVIA BENGALENSIS. ROTTLER.

Saya elley, TAM.; | Yelaitie Cafoor ka paat DUK.

(7336) SALVIA COCCINEA. This, as with all this very extensive genus chiefly of extremely showy flowering plants of every variety of color, is well worthy of cultivation; the plants may all be grown from seed in any good garden soil at the commencement, or after the rains.—*Riddell.*

(7337) SALVIA GLUTINOSA, vegetates on the mountains of Cashmere, but is not used.—*Honigberger.*

(7338) SALVIA MOORCROFTIANA, is found plentifully growing in the valley of Cashmere; its seeds are officinal, both at Cashmere and Lahore.—*Thirty five years in the East by Dr. Honig. p.* 339.

(7339) SALVIA OFFICINALIS. SAGE.

Salbia HIND.

A slightly aromatic, shrubby, but dwarfish plant, of somewhat bitter and very hot, aromatic, and slightly astringent flavour. These qualities are retained on drying. It affords on distillation with water a large quantity of essential oil, containing 26 per cent, of camphor.—*O'Shaughnessy, page* 487. *Sage* is used for stuffings and flavouring various dishes: culture difficult to manage, but some of the Indian varieties might be more useful.—*Jaffrey.*

(7340) SALVINIA CUCULLATA. This curious little floating plant, related to the ferns, of the genus Salvinia is often seen on the surface of old tanks and stagnate waters in Tenasserim. —*Mason.*

(7341) SAMADERA, a genus of plants belonging to the natural order *Simarubaceæ*, which was named by Gærtner, though the origin of the name is unknown. The genus, though containing but few species, includes *Vittmannia* of Vahl and *Niota* of Lamarck. The genus is characterised by having bisexual flowers; calyx 4-5-partite; petals 4 5, much longer than the calyx;

stamens 8-10; ovaries 5-seeded, on a short stalk-like gynophore; styles. Fruit of one or more carpels, usually drupaceous. The genus is composed of trees or shrubs, with simple alternate and reticulately-veined leaves. Peduncles are axillary or terminal, pendulous when in fruit and divided at the apex into a 5-12-flowered umbel. *S. tetrapetala* is a shrub, 10 feet in height, a native of Madagascar. *S. lucida* (*Niota lucida*) is another shrub, figured by Dr. Wallich (' Pl. As. Rar.,' t. 168), from Amherst, on the coast of Martaban. *S. Indica* (*S. pentapetala* of authors) is a large tree, a native of Southern India, especially on the Malabar coast; the fruit and bark are intensely bitter, like that of the other plants of the Quassia family. Niepa Bark, an Indian febrifuge, is obtained from this species.—*Eng. Cyc.*

(7342) SAMADERA INDICA. This tree is common throughout the Southern Concan.—*Eng. Cyc.*

(7343) SAMADERA LUCIDA. Samadera. The low grounds near the sea coast of Tenasserim are ornamented with a handsome shrub which is a species of Samadera, and bears a rather curious flower. Like the quassia of the same tribe, its leaves are most intensely bitter, and may perhaps possess the virtues of quassia. Wight says it is cultivated in the gardens about Batavia; Mr Mason has never seen it out of its native jungles on this Coast.—*Mason.*

(7344) SAMBUCUS NIGER, is unknown to the Lahore native doctors. But Sambucus adnata and S. Ebulus (Dwarf elder) are found growing in the Himalayas as well as in Cashmere. The roots of the latter, it is said, have purgative properties, and, as also the berries, are used in dropsy.—*Thirty five years in the East by Dr. Honig. p.* 340.

(7345) SAND. This name is popularly applied to any comminuted minerals, but, properly belongs to granular quartz, silica, or flint, the chief ingredient in the sands of the deserts, sea-shores, river banks and soil. Sand is produced by the disintegration of rocks, and its colour, which is generally imparted by oxide of iron, may be red, white, grey, or black. The pure colourless sands are much in request for the manufacture of glass. Sand is also used for making mortars, and for filters, and in the operation of *Casting* and *Founding*. Sand is also used in sawing and smoothing building stones and marbles, and in many other grinding and polishing operations. River and pit sand are usually sharper than sea sand, for this has been rounded by attrition. The washed scrapings of roads which have been repaired with flints furnish the sand used by stone masons *Grindstone dust* is a form of sand useful for some puposes; it cuts deeper than *Flanders brick*, which is another form in which sand is used. Grindstone dust is formed during the turning of the grindstone into form.—*Tomlinson.*

(7346) SAND BINDING PLANTS.

(7347) *Spinifex Squarrosus.* Linn. The species known to Europeans by the designation of "Ground Rattan" also called "Sea Pink," Ground Rattan. These names are both popular misnomers, the correct designation is " Spinifex" of Botanists. The Tamil name, *Ravnen mise*, i. e. Whiskers of Ravanah, is a descriptive epithet, This comes nearest to the *Sand Carex* of England in its habit of growth, creeping along horizontally, sometimes above, sometimes below the surface of the earth, emitting roots and shoots at short intervals of a few inches. It likewise possesses the advantage of being extremely tenacious of life; the shoot at every node is capable of renewing the existence of the individual as fast as destroyed, and the whole plant offers a resistance to the effects of a storm which is rarely overcome. This species would be nearly as indestructible from natural causes as Couch grass, and would speedily colonize the sand tracts spontaneously, if it were only left unmolested for a year or two.

(7348) *Ipomœa pes-capræ*, Sweet.

Mosul Tayhe, Tam.

Goat's foot leaved *Ipomœa*, (also known as " Rabbit weed"). Perennial, creeping to a very great extent. Stems rooting at distant intervals. Leaves smooth, long petioled, two lobed, like those of *Bauhinia*, tipped with a *neucro.* Flowers large, reddish purple, very handsome. Common on the sandy beach north and south of Madras, where it is of great use in binding the loose sand, and in time rendering it sufficiently stable to bear grass. This fine creeper is equally abundant in both peninsulas, and is also a native of Mauritius, Macao, &c., occupying the place of *C. Soldanella* of the British coast, and a more striking and beautiful species of the Tropical Bind weeds is rarely seen. Rabbits, goats, and horses eat it, so do cows, but their milk is tainted. Great difficulty occurs in raising this plant in the vicinity of houses —as the inhabitants tread it down, and cattle nibble the tender shoots. It naturally takes a higher position on the sand-bank than the Spinifex, and suffers less injury during a storm, but they often grow together and conjointly effect much benefit. The Spinifex arrests the drifting sand, and the Ipomœa secures what the former collects. Mr. Caddell has planted it most extensively along the Canal banks near Tranquebar.

(7349) *Canavalia obtusifolia* D. C.

Koyli avaree, Tam.

Common on the sea-shore, frequently entwined with the last named binder, is also a very useful plant, and is very abundant at the Adyar, Ennore, the mouth of the Godavery, and between Quilon and Anjengo.

(7350) *Hydrophylax maritima*, Linn. Seaside *Hydrophylax*. A straggling herbaceous plant, native of the shore of Coromandel, where it shows its pale lilac blossoms great part of the year. The branches run over the sand, sometimes under the surface, and strike root at the joints. It answers well when the sand is moist.

(7351) *Microrhynchus sarmentosus*. Wight. A widely diffused humble plant, common along the sea beach, with long flagelliform runners; but may not possess sufficient strength to effect the object in view. It is well figured in Wight's Illustrations, Vol. II., t. 133. (Plate No. 5).

(7352) *Pupalia orbiculala*, Wight. *Achyranthes orbiculate*, Heyne, Wallich, *Cyathula orbiculata*, Moquin.

Adai Yotti, TAM.

Occurs on sandy soils near the sea beach, abundant at St. Thome, and near the mouth of the Adyar River. It is an extensively spreading procumbent plant, the branches being often several feet long; bristles attaching themselves to the clothes of passengers, cling to them with tenacity.

(7353) *Pandanus odoratissimus*, Linn. (Kaldera bush.)

Taylie Marm, TAM.

A large spreading ramous shrub, often planted in belts, but takes up much room, forms dense thickets, and harbours venomous reptiles. The lands in which Chay Root is cultivated are often protected from drift sand by means of this shrub. It is a *very strong binder*, but is objectionable from its raising sand-hills.

(7354) *Ehretia arenaria*, Sand Ehretia Griffith, which is found between 12° and 28° N. L. binds together loose sand, in a minor degree. It may be the same as Ehretia (X) cuneata? Wight Icon. Vol. IV. t. 1385 which grows on sand banks in the beds of all our rivers.

The above are the sand-binding plants most frequently noticed along the Coromandel beach. There are others as *Pedalium murex*, *Ipomœa pes tigridis* and *Sesamum prostratum*, &c., which co-operate in the work of conservation to a minor extent, but are less widely diffused along the coast; also Fagrœa Coromandellia. Trees such as the Cashew (*Anacardium occidentale*) the Alexandrian Laurel (*Calophyllum Inophyllum*) and the wild Date (*Phœnix sylvestris*) grow well, and render a double service by preventing a further encroachment of sand, and rendering the land useful.—*Cleghorn.*

(7355) SANDA. A sort of Lizard. It is distilled in Ajmeer and the product applied by Mohammedans, to the penis: the reptile is also eaten as an aphrodisiac.—*Gen. Med. Top. p.* 151.

(7356) SANDAL WOOD. SANTALUM ALBUM. SANDAL WOOD TREE. and its WOOD.

Chandana, HIND BENG.
Aikamenil, TIMOR.
Ayasra, AMBOIN.
Kat chundan, HIND.
Tan-Muh, CHIN.
Cayhundahu, COCH-CHIN
Sundel Abiez, ARAB.
Chandana, BENG.
Srigunda, CAN.
Tan-muh CHIN.
Cayhu-yuhdan, COCHIN-CHIN
Sandoon, CYNG.
Sandale, FR.
Sundul, Sookur, GUZ. & HIND.
Sundul, DUK.
Sandalo, IT.
Tsjendana, MAL.
Sundult Suffaid, PERS.
Chündron chandana, Malayaja, SANS.
Chandanum. Shandana-Cuttay, TAM.
Chendanum, TEL.
Faulkner.

Sandal wood is much used among the Chinese in cabinet work, and in the manufacture of fans and other ornamentul works. One kind is the produce of a small tree (*Santalum album*) growing in India and Ceylon, which gives its title to the natural order of plants called *Santalaceæ* or Sandalworts. The sandalwood of the Sandwich islands is from two other species of the same family, *S. Freycinetianum* and *S. paniculatum*. In the native medical practice of India, Sandal-wood furnishes a sedative cooling medicine: it is also largely employed as a perfume in the funeral ceremonies of the Hindoos. By the Chinese it is ground into powder and used as a cosmetic. The bark affords a beautiful red dye, but so fugitive as to be useless. The tree grows freely among the mountains of Malabar, near the sea coast, whence Calcutta obtains her supply of sandal wood, and in Timor and the Feejee islands, from which China derives her chief supply. The tree is cut down when about 9 inches diameter at the root; it is then cleared of its bark, and cut into logs, which are buried for six weeks or two months in order that the white ants may clear off the outer wood; this they do most effectually, without touching the heart of the tree, which is the only valuable part. Sandal-wood should be of a fine deep yellow brown, and highly perfumed. The average importation of this wood into Calcutta is 200 tons per annum. The Chinese imported an amount of sandal-wood in 1838 worth about one hundred and fifty-thousand dollars, but this is said to be doubled in some years. The supply to Europe is very small and chiefly derived from that which has been brought over by individuals without a view to commerce.—*Tomlinson.*

An aromatic wood obtained from a small tree (*Santalum album*); resembling the myrtle, found in Malabar, Timor, and in the Sandwich and Fejee Islands. It is much used in India and China for burning in temples, for cabinet-work, toys, fans, and perfumes. Sandal wood is imported into Bombay from the Malabar Coast, and is re-exported to China, England and Calcutta. A description of white sandal wood, termed (*Vern*) Lava or Lawa, is imported into Bombay from Zanzibar, and is applied to the same purposes as Malabar sandal wood. The wood is extensively employed as a perfume in the funeral ceremonies of the Hindus. The deeper the colour, which is of a yellow-brown, and the nearer the root, the better is the perfume. Malabar produces the finest sandal wood but it is also found in Ceylon, and the South Sea Islands. It is imported into England in trimmed logs from 3 to 8 and rarely 14 inches diameter, the wood is in general softer than box-wood, and easy to cut. It is used for parts of cabinets, necklaces, ornaments, and fans. The bark of the sandal-wood gives a most beautiful red or light claret coloured dye, but it fades almost immediately when used as a simple infusion, in the hands of the experienced dyer it might, it is supposed, be very useful.—*Tredgold.*

Two species of this wood are however known in commerce—the *white* and the *yellow.* Ainslie states, and his opinion is generally received, that both are from the same tree, the former being the outer layers of the wood.

The *white sandal-wood* is coated with thick, compact bark, having a grey and brownish epidermis; the wood is very hard, heavy, susceptible of a fine polish. It occurs in billets of middling size, is nearly inodorous, its taste being slightly bitter.

The *yellow,* or *citron sandal-wood,* is straight or twisted, lighter than water when taken from the trunk, heavier if from the roots in yellow, fawn-coloured, or reddish billets, slightly shining, of middling hardness, taking a fine polish, and being very easily cleft.

The odour of this wood is very strong, rose like, and enduring, its taste slightly bitter. The wood of the *Plumelia alba* is occasionally substituted for the true sandal. The odour is due to the presence of an essential oil, heavier than water, readily congealed, and having a peculiar sweet smell. Sandal-wood is extensively used by cabinet-makers for the fabrication of various articles of ornamental furniture. The oil is employed by the European perfumers, and in India is very extensively used for the adulteration of attar of roses. The wood in powder is given by the native physicians in ardent remitting fevers, and supposed to be sedative and cooling; with milk it is also prescribed in gonorrhœa. (*Ainslie.*) The powder is rubbed on the skin to ally the irritation of musquito bites, of prickly heat, and other cutaneous disorders.—*O'Sh. page* 532. Sandal wood grows in the islands of the Malay Archipelago but more especially in Timor and in the island which takes its European name from it. From these it extends to the South sea islands, having been found in the Fijie, Marquesas and Sandwich group. The Chinese consume it largely as an incense, perfume and fancy wood.—*Crawfurd, p.* 375. It is often elegantly carved. At the Madras Exhibition of 1855, a box exhibited by Mrs. Wilkieson, was undoubtedly the best specimen of the sandal wood carving. The figures and ornaments were taken from the sculptures in the celebrated temple of Hullabede in Mysore, they were boldly and deeply cut and well finished. The work was executed under the direction of Captain Cunningham of the Mysore Commission and was carved by a native of Soorub, from careful drawings prepared expressly for the purpose. Some very creditable specimens of carved sandal wood were exhibited by the Bangalore Local Committee, of these the most deserving of notice are two large and two small boxes carefully finished and varied in the design; but not so bold in relief as the box from Soorub. The Bangalore Local Committee also exhibited two rosewood carved boxes very similar in design to those made of sandal wood. The ornaments were all floriated without figures and clearly cut, but the general effect of the work was spoilt by the deep ground work being dotted instead of being left flat. The Canara Local Committee contributed a well carved sandal wood chess table, a model of a Hindoo car, and some neatly finished boxes, one of which was inlaid with ivory and metal. Mrs. James Fraser exhibited two card cases and a work box carved at Ganjam, a district where the manufacture has been recently introduced. Well carved sandal wood chowries were exhibited by Lady Montgomery, and the Madras Local Committee. Mr. Meppen contributed sandal wood bracelets and crochet needle holders made near Cuddoor in Mysore, and Mrs. Bourdillon a box containing sandal wood knitting pins and silk winders. The art of carving in sandal wood though creditable to the Natives of India, as evincing care and laborious industry, owes its chief value to the quaintness of the designs and the elaborate nature of the work. As a branch of the fine arts it can hardly be ranked under the head of carving, as many of the specimens are little more than ornamental surface, showing much of the plain rectangle in the leading forms and little originality of invention.

The art in India, is still susceptible of great improvement. Some neatly finished writing books, card cases and inkstands of sandal wood, inlaid with Ivory, Ebony, and Metal, were contributed by Mr. G. Leonard of Chicacole, were interesting specimens of an Indian manufacture, for which there is an increasing demand. Bombay had hitherto been the chief market for this manufacture, but it is now carried on at Chicacole, Hyderabad, and Vizagapatam. Some creditable specimens of inlaid fancy woods were exhibited by the Travancore Local Committee; the best of these were a lady's workstand with silk winders, and a backgammon board. A carved cocoanut cup mounted in silver exhibited, was deserving of notice.—*M. E. J. R.*

(7357) SANDALWOOD OIL. SANTALUM ALBUM.

Chundana yennai, TAM.; Sundal-ka-Teil, HIND.

The oil of sandal wood is highly valued as a perfume by the natives of India; and is employed in the adulteration of otto of roses. It is chiefly made on the Malabar Coast, whence it is brought to Bombay, and re-exported to England, China, and the Arabian and Persian Gulfs. The exports from Madras, amount annually to about 100 cwt. Sandalwood oil and the large variety of atturs, &c., which form the principal part of native perfumery are included in this class.—*M. E. J. R.*

(7358) SANDARACH.

Sandroos, Arab, Zoos, ARAB.

A resinous substance met with in round or elongated tears, of a whitish or pale-citron yellow brilliant, transparent and limpid, brittle under the teeth, burns with a clear flame, and emits a pleasant odour; taste resinous, and slightly balsamic. It is used as an ingredient in varnishes, and incense; when reduced to a powder, it forms the article termed *pounce*. Sandarach is obtained from Morocco.—*Faulkner.*

Sandarach is said by some writers to exude in hot climates from the bark of the common juniper-tree (*Juniperis communis*). Others state it to be produced by another tree of the pine tribe called *Thuja articulata*, but according to Brongniart and Schonsboe, it is the tears of *Callitris quadrivalvis*, also a coniferous tree. Dr. Lindley says, "I have seen a plank two feet wide of this sandarach tree, which is called the "arar" tree in Barbary. The wood is considered by the Turks indestructable, and they use it for the ceilings and floors of their mosques." The resin is received in the form of loose granules or tears, whitish yellow, brittle, and having a faint resinous smell, and acrid taste. It is used dissolved in spirits, as a varnish; it is also employed as incense, and as a pounce-powder.—*Tomlinson.*

(7359) SANDORICUM INDICUM.

Theit-to, BURM.

The only species of this genus is an elegant tree of considerable size, which is found in the Molucca and Philippine Islands, as well as in the Southern parts of India. The leaves are alternate and trifoliate; leaflets entire; panicles axillary with the flowers crowded on the short partial peduncles. The fruit is acid, and sufficiently agreeable to be mixed with syrups to make cooling drinks. Its root is bitter and used in medicine in bowel complaints. It is sometimes called False Mangosteen from some resemblance to its fruit and also Indian Sandal-Wood.—*English Cyclopedia, page* 660. This timber tree is large and plentiful, both in the Rangoon and Tunghoo districts. It is one of those trees which are cultivated by the Burmese for their fruit. It is found near all large villages, but it is scarce in the forests. Wood white colored, adapted to every purpose of house-building.—*McClelland.* The Sandoricum indicum tree bears a fruit the size of an orange, occasionally called the wild mangosteen, to which it bears some resemblance. It has a fleshy acid pulp and makes a very good jelly, but has a peculiar odour. The natives of Tenasserim eat the fruit raw, and esteem it excellent.—*Mason.*

(7360) SANDSTONE, an aggregation of sands by a sort of semifusion as in quartz rock, and in common gritstone, adjoining trap dykes or great faults. In many of the white sandstones the grains merely cohere together. In the sandstones of coal tracks the finer particles of carbonate of lime, clay, oxide of iron, &c., are interposed between the grains: in other cases, as in the Hastings sandstones, an infiltration of carbonate of lime has taken place. Some sandstones are in the laminæ, plane, waved, or slightly concentric: these admit of being readily split. The freestones are not distinctly laminated, the grains being so arranged as to present equal resistance in every direction. They work *freely* under the stone saw and the ordinary picks and chisels. They can also be turned into balustrades, pedestals and vases.—*Tomlinson.*

(7361) SANSEVIERA is a genus of Liliaceous plants, of which individuals are very abundant on the coast of Guinea and of other parts of Africa; also around Ceylon and other Eastern Islands, all along the Bay of Bengal, and extending thence to Java and to the coast of China. The leaves are succulent, and abound in fibre remarkable for fineness and tenacity. Dr. Roxburgh proposed that the fibres might be called *Bowstring hemp* in England, because the natives of the Circars make their best bowstings of them.—*Royle.* This genus, indeed, is remarkable for the strength and fineness of the fibres of their leaves. The genus is characterised by having a corol-like funnel-shaped perianth, which has a long rather straight tube, a sexifid limb, of which the divisions are either spreading or revolute. Stamens 6, inserted into the throat; filaments filiform; ovary 3-celled; ovules solitary; style filiform; stigmas obtuse, obscurely 3-lobed. Berry 3-celled, 3-seeded, or, from becoming abortive, 1-celled and single-seeded. The plants have a thick creeping root-stock, with radical equitant leaves, which are fleshy and often spotted; the stem-leaves are scale-like, and the flowers in racemes or thyrsi. In Britain they are easily cultivated and propagated in sandy loam in bark stoves. —*Eng. Cyc.*

(7362) SANSEVIERA LANUGINOSA, is a species, found on the sands of Malabar, while *S. Guineensis* is a species found along a great extent of the west coast of Africa, and which, from affording fibres which, like those of the Indian species, are fine and strong, has been called African Bow-String Hemp. This has been proposed as a substitute for and considered even superior to New Zealand flax. *S. Guineensis* is distinguished by having uniform lanceolate leaves, the style twice as long as the stamens; the bracts only a third of the length of the tube of the corolla ; the flowers sessile.—*Eng. Cyc.*

(7363) SANSEVIERA ROXBURGHIANA, is a species, according to Mr. Haworth, which was confounded with S. Zeylanica, by Dr. Roxburgh, and which the latter has figured in his 'Coromandel Plants.' It has linear ensiform leaves, which are channelled, keeled, subulate at the apex, green, and longer than the scape ; style as long as the stamens ; the bracts minute. Dr. Roxburgh describes this plant, and says it is called Moorva in Sanscrit, and in Bengalee Moorba, that in English it may be called Bow-String Hemp, and that it grows very commonly under bushes in the jungles in almost every soil in the southern parts of India. It flowers from January to May. In a good soil, and where the plants are regularly watered, the leaves become three or four feet long, and contain a number of fine remarkably strong white fibres, which run their whole length. The natives make their best bow-strings of these fibres, which are separated by the leaves being placed upon a flat strong table, when one end is pressed down with the foot, and the rest scraped with a piece of hard wood held in both hands. Forty pounds of leaves thus scraped yield about one pound of clean dry fibres. The fibres may be applied to a great variety of uses. As the plant grows readily from the slips which issue in great abundance from the roots, and as they require little or no care, Dr. Roxburgh recommended their cultivation in sandy soils. It has lately been proposed in Calcutta to try the fibre on a large scale for rope-making.—*Eng. Cyc.*

(7364) SANSEVIERA ZEYLANICA. THUMB.

The Tree.

Marool,
Murle,
Moorva.
Moorghabee.
Dant Saga or Sago Nar.

The Root

Marool Kalung, TAM.
Moorgabie ka gudda, DUK.
Changa gudda TEL.
Muroova SANS.

The Fibre.

Marool,
Murle,
Moorva.
Moorva Fibre, Marool of Madras, Bowstring Hemp, ENG
Moorghabee,
Dant Saga or Sago Nar,
Murva, SANS.
Moorga and Moorgavee, BENG.
Marul, TAM.

Sanseviera Zeylanica, is found in Ceylon, and along the coasts of Southern Asia ; has smooth oblong-acute, flat, and linear lanceolate, channelled, glaucous leaves, which are shorter than the scape ; the style as long as the stamens, the bracts equalling the peduncle in length. This, like some of the other species, is remarkable for the tenacity and fineness of the fibres of its leaves.—*Eng. Cyc.* This plant appears to abound in most parts of the Madras Presidency, it has narrow striped leaves and resembles the Agave in some of its characters, but produces finer fibres, which are easily separated from the pulp. At the Madras Exhibition of 1855, they were contributed by the Travancore and Tanjore Local Committees, the Madras School of Arts, Mr. Jaffrey and Mr. Thorpe : several of the contributions from other localities were discolored from steeping, and one or two were dirty, grey and brittle. This fibre has long been known as a useful material for cordage and it is soft, silky and pliant when well prepared. It is about equal to the Agave fibre in point of strength, but as it is a finer material, it might be applied to a better description of manufactures. The plant is easily propagated and yields a good crop under cultivation. It was tried against Russian Hemp, on board the *Thalia* East Indiaman, when commanded by Captain Biden, and was highly approved of ; it has also been made into fine cloth. Some good thread, twine, rope and cord made from this fibre in the Madras Justice's jail, and house of correction were exhibited by Dr. Hunter, along with ropes made from the Agave, Musa, Yucca, and Calotropis fibres.—*M. E. J. R.* *Sanseviera zeylanica* is the best-known species of the genus and has been so called as being common on the Ceylon coast. From it, as above, has been distinguished *S. Roxburghiana*, common on the coasts of the Bay of Bengal, but apparently on insufficient grounds. It is figured by Dr. Roxburgh himself under its former name in his 'Coromandel Plants,' ii, tab. 184. *S. lanuginosa* is probably a distinct species, the *katu-kapel* of Rheede ('Hort. Mal.,' vol xi, tab. 42), which grows on the sands of the Malabar coast. All are closely allied to each other, and to the African *S. guineensis*. Of this, the fibres have been occasionally introduced into the markets of Europe, and by some thought superior to New Zealand Flax. They have been called African Bowstring Hemp. (Royle's 'Himal. Bot.,' p. 391.) The Indian species of Sanseviera was first described by Sir William Jones, in the 'Asiatic Researches,' vol. iv, p. 271, under its ancient Sanscrit name of *Moorva*, and he says, that—"From the leaves of this plant the ancient Hindoos extracted a very tough elastic thread called Maurvi, of which they made bowstrings ; and which, for that reason, was ordained by Menu to form the sacrificial zone of the military class." Dr. Roxburgh describes the plant as common on the jungly salt soils along the coasts, growing under the bushes, and easily propagated on almost every soil, from the slips which issue in great abundance from the roots, requiring little or no care, and not requiring to be renewed often, if at all, as the plant is perennial. The leaves, when thus cultivated, are from three to four feet long. The fibre, which extends their whole length, is separated from the pulpy part of the leaves. The natives place them on a smooth board ; then press one end of the leaf down with one of their great toes, and with a thin bit of hard stick held between the two hands, they scrape the leaf from them, and very quickly remove every part of the pulp. This can also be removed by steeping the leaves in water till the pulpy parts rot, &c. Dr. Buchanan found apparently the same plant, but which he calls *Aletris nervosa*, employed for making cordage near Bangalore. Before the leaves are beaten to separate the fibres, they are steeped in water fifteen (others say five) days, in order to rot the useless parts; but with Dr. Roxburgh the fibres became discoloured by this process. Dr. Roxburgh sent drawings of the plant and specimens of the fibre (*v.* 'Obs.,' p. 18) as early as the year 1790 to the Court of Directors, and again in 1800 by Mr. Bebb; after he had cultivated a begah (*i. e.*, third of an acre of ground) with this plant. As full grown leaves of three to three and a half feet long yielded about one pound of the clean fibre for every forty pounds of the fresh leaves, Dr. Roxburgh concluded that this plant might be cultivated with advantage. By another calculation he found that one acre would yield 1613 pounds of clean fibre and at a gathering, two of which may be reckoned on yearly, in a good soil a favorable season, fter the plants are of a proper age. He lso ascertained that a line four feet long. made of *moorva* fibre, bore a weight of 120 lb, when a cord of the same size, made of Russian hemp, bore only 105. The former, moreover, after 116 days' maceration, bore a weight of 30 lb., when the latter was complete- y rotten. Dr. Roxburgh further observes: Should it ever become an object of culture, a ess expensive and more expeditious method of learing the fibres from the pulpy parts of the eaves, than that of the natives above mentioned, must be contrived." This seems to have been nce done. For the Rev. J. Garrow, as quoted y Mr. Murray, states that, in the year 1831. uring his residence in Cuttack, in the province f Orissa, he first by mere accident discovered hat the leaf of the *Aloe angustifolia.* [It is not asy to ascertain what plant is here meant, but is probably only a variety of Agave, as no spe- es of Aloe is known to be indigenous on that oast] of Linnæus, contained a quantity of long hite fibres. Perceiving that this material pos- ssed great strength, clearness, and tenacity, he used some quantities of the leaf to be beaten t with mallets, and the fibres to be withdrawn d in this way collected about three hundred- eight of fine grass, the fibres severally running out three feet long. On taking this to Calcutta, r. Tapley, chief officer of the Thalia East diaman, then lying off that port, had some it manufactured into ropes. On a fair ail of a three-stranded rope of this materi- with a similar one of Russian hemp, in ising two and a half hundred-weight of spelter from the hold, the grass faithfully brought it up on three successive occasions; whereas, in applying the hempen rope, twice out of three times it gave way, and in the third trial lost one strand. Both Mr. Tapley and Capt. Biden, the commander, highly approved of the article, as did many commanders of ships of other nations then frequenting the port of Calcutta. "On the writer's return to Cuttack he laid waste the whole of the aloe plant he could discover, without respect to species; and to save time and labour, passed the leaves through a *pressing mill* similar to that used for expressing the juice from the sugar cane. He then caused them to be laid in heaps under water for some days, till the fleshy portion of the leaf was decomposed, by which means the fibres were more easily collected; they were then hackled and baled. In the course of a short time afterwards he discovered a short species of aloe, growing widely and profusely in all the moist woods of the neighbourhood, which the natives called *Moorgubbee.* On experiment, this plant produced a most beautiful fibre, as soft and as fine as human hair, but possessing, notwithstanding, extraordinary strength and tenacity. He derived a great quantity of flax from this plant, which, when portioned off in hanks, bore a strict resemblance to raw silk; indeed, side by side, the difference could not be distinguished. It was this article that first induced the writer to turn his attention to the manufacture of cloth. He engaged two native 'Tantees,' or weavers, to construct a narrow loom for this purpose. They at first found some difficulty in the undertaking, but in the course of four or five days they produced as fine a piece of cloth as was ever beheld: one portion of it the writer presented to Sir Charles (afterwards Lord) Metcalfe." The fibres of the Sanseviera may, from their fineness, combined with tenacity, be applied to a variety of purposes. Dr. Roxburgh at one time supposed, though as we now know, erroneously, that they were identical with China grass. They are usually about two feet in length, but may easily be obtained longer, if plants are cultivated. The fibres are firm, hair-like, and silky, and resemble those of the pine-apple most closely. The tow is excellent for paper making. The natives of Bengal twist the fibres into a fine thread, upon which they string ornaments to be hung round the neck; those of the coast employ them for making browstrings, and the Rajpoot thread is sometimes made of its fibres. They readily take dyes, as was some years ago shown by Miss Davy, and specimens dyed red, orange, maroon, and green, were sent to the Exhibition of 1851 by Dr. Hunter. Miss Davy, moreover, had some cloth woven with the fibres, after some difficulty, but the fibre was still too wiry, from imperfect preparation. The weaver. moreover, having neglected to separate the coarse from the fine fibres, gave the cloth an uneven and irregular appearance. But if the necessary care was taken with this, as with all other fibres, there seems no reason to doubt that it might be applied to the fabrication of fine cloths, in the same way as pine apple fibre The fibre has been proposed for the packing of steam-engines, and its tow used to be, and perhaps still is, converted into very good paper at Trichinopoly. As the Moorva fibre is employed by the natives for their bowstrings, there can be no doubt of its possessing sufficient strength for rope-making. In some recent experiments, this fibre, in its untwisted state, bore 280 lb., when Agave fibre broke with 270 lb. Dr. Wight found some string made of the latter, broke with 362 lb., while the Sanseviera broke with 316 lb., so that these two may be considered as nearly equal to each other in strength. Attention was called to the fibre of Moorgavie by Mr. A. Bond, Master-Attendant at Balasore, who sent to the Marine Board of Calcutta some of the fibres prepared from the leaves of plants growing in the jungly salt soils along the coast from Kedgeree southward, informing the Board that he had found the fibre useful on board the Hon. Company's schooner Orissa, as it answered excellently for running gear. On the receipt of the samples, the Board having desired the Master-Attendant at Calcutta to submit them to trial, the latter reported that it was "not equal in strength to the Europe or Manilla hemp, but that it seemed to take hot tar as well as the latter, and would answer generally for the same purposes as those to which the Europe and Manilla cordage is applied." The following were the results obtained :

Europe hemp, made of sewing twine (untarred)	broke at	212 lb.
Harris's patent colonial bolt rope (tarred)........................	,,	201 ,,
Manilla hemp (untarred).........	,,	188 ,,
Europe bolt rope (tarred)...	,,	168 ,,
Balasore fibre (untarred), at Calcutta	,,	137 ,,
Ditto, spun by Capt. Bond (thumb line).....	,,	135½ ,,
Europe rope (tarred)................	,,	88 ,,

In a further report, Capt. Bond stated, that forty maunds of the fresh plant produced one maund of fibre. The expenses of the experiment were high, as the plant had to be brought to him from some distance (four miles) to the place where it was dressed, and the best methods of separating the fibre had not been followed. The natives being averse to a work which their forefathers had never taken in hand. The plants having been steeped for eight days, were beaten out on a stone or plank, and then taken to another tank of water to be washed, and then dried and combed. All these processes necessarily increased the expenses. Mr. Bond further ascertained that the steeping spoiled the colour of the fibre, at the same time that it diminished its strength. With some fresh specimens of the fibre he also sent two pieces of cloth, which had been woven from threads spun by fishermen, which were irregular in thickness and so, consequently, was also the cloth. From the abundance of this plant in many situations, from the ease which it may be cultivated, and the facility with which the fibre may be separated and cleaned, there is no doubt that it could be produced as cheaply as any of the other fibres ; and it has been shown that it is capable of being used for a variety of purposes. as for textile fabrics, and for string and cordage, as well as for paper-making. It is abundantly diffused, especially along the coasts, and its fibre was sent to the Exhibition of 1851, from Assam and Cuttack, as well as from Madras, Coimbatore, and the Malabar coast—*Royle. Fib Pl.* At the Madras Exhibition of 1855, of the *Marool or Munjee Nar, Sanseviera zeylanica*, Hurry Row exhibited the best specimen. Those from Kurnool in larger quantities were good samples and deserved notice. The Jury observed that the Marool or Sanseviera is a plant that has not long attracted notice but is unquestionably deserving attention. In some parts of Indi very large quantities are found, growing wild On the Pulicat Hills it is to be met with i some abundance, and in the Kurnool District i is most plentiful. It is of the same natural order as the aloe (not agave) and capable of cultivation. From its strength and the softness o its fibre, it might be brought more into use, an become a valuable product, possessing as i does the property of resisting the usual effects o damp.—*M. E. J. R.* The root is in a slight degre warm to the taste, and of a not unpleasant odour is prescribed by the native Practitioners, in th form of electuary, in consumptive cases an coughs of long standing. The juice of the tender shoots of the plant (which is the Katukap of the Hort. Mal.) they give to young childre for the purpose of cleaning their throats of visci phlegm.—*Ains. Mat. Med. p.* 88.

(7365) SANTALACEÆ, a natural order (Plants belonging to the class of Exogens an and sub-class *Incompletæ*. They are tree shrubs, or herbaceous plants, with round or irregularly-angled branches ; alternate or nearly opposite undivided leaves, sometimes minute, an resembling stipules. The flowers are small, i spikes, racemes, umbels, or solitary. The caly superior, 4- or 5-cleft. Stamens 4 or 5, opposite the segments of the calyx. Ovary 1-celle with from 1 to 4 ovules. Fruit 1-seeded, har dry, and drupaceous. Albumen fleshy. Th order is closely allied to *Loranthaceæ* and *Ari-*

tolochiaceæ. One of its most remarkable characters is that its unilocular ovary contains always more ovules than one, which are pendulous and attached to the apex of a central receptacle. In the form of weeds the genera of *Santalaceæ* are found in Europe and North America; in Australia the East Indies, and the South Sea Islands, they exist as large shrubs or small trees. *Osyris* belongs to this order, although it differs in having diœcious flowers and a trifid calyx. This is however a different plant from the *Osyris* of Pliny, which possessed in former times a reputation for curing every disease. The modern genus possesses no sensible properties as a medicine, and is principally employed for the manufacture of besoms, for which its long slender branches well fit it. The Ogechee Lime, which s used on the Mississippi instead of olives, is he fruit of *Nyssa candicans.* The *Nyssæ* form rees of great beauty, and their wood is white, soft, compact, and light. The most valuable genus in this order is its type the *Santalum*, of which the species *S. album* forms the true sandal-wood of commerce.—*Eng. Cyc.*

(7366) SANTALUM, a genus of Plants which gives its name to the natural order *Santalaceæ*, o which it belongs. It has hermaphrodite flowers, the perianth united at the base with the ovary, the limb superior, tubelar, and ventricose, quadrifid, deciduous; glands four, compressed, inserted into the throat, alternating with the lobes of the limb. Stamens 4, inserted into the throat opposite to the lobes of the limb; filaments awl-haped, loaded with a pencil of hairs behind; anthers 2-celled; ovary half inferior, 1-celled; ovules 2 antropous pendulous from the apex of a free central placenta, style filiform, simple; stigma obscurely 2-3-lobed; drupe berried, 1-seeded; margined at the apex. Seed inverse. Embryo straight at the apex of a fleshy albumen. Radicle above.—*Eng. Cyc.*

(7367) SANTALUM. *Species.* WILD SANDAL WOOD. An inferior kind of sandal wood is produced by a tree in the southern part of Mergui province, and forms an article of commerce.—*Mason.*

(7368) SANTALUM ALBUM. SANDAL WOOD. *Santalaceæ*, Roxb. C.

Chunduna or Ghundasaru, DUK.
Shandanum, TAM.
Gandaga mara, CAN.

S. album, or the White Sandal-Wood Tree, is a native of the mountainous parts of the coast of Malabar, and also of Timor and the islands of the Indian Archipelago, and it is probable that the same species extends to great distances. It forms a tree of moderate or rather of small size, but much branched, and in general appearance has been often compared to the myrtle, and in inflorescence to the privet. The leaves are opposite, with short petioles, oblong, entire, smooth, glaucous underneath; length from one and a half to three inches. The infloresecence is in axillary and terminal thyrsi. Flowers numerous, small, straw-coloured, when they first expand, but change to a deep ferruginous purple; they are inodorous, as are all the exterior parts of the growing plant even when bruised. The tree when felled is about nine inches or a foot in diameter; it is then barked, cut into billets, and said to be buried in a dry place for about a couple of months. The deeper the colour and the nearer the root, the more fragrant it is. As seen in commerce it is in compact pieces of a white colour and agreeable odour, but with little taste. It is usually described as being the young and outer wood, and that the inner parts, as they become older, become coloured towards the centre, and that this is the source of the yellow, while the white sandal-wood consists of the outer and younger wood of the same tree. This is the general opinion respecting the origin of yellow sandal-wood, but Garcias thought it in his time to be the produce of a different tree. M. Gaudichaud is of the same opinion, and has moreover figured the plant in plate 45 of the botanical parts of the 'Voyage de l'Uranie.' This he saw in the Sandwich Islands, and has named it *S. freycinetianum;* stating it to produce the sandal-wood which is so much valued by the Chinese, which they also obtain from the Feejie and Marquesa Islands, Moluccas, &c. They manufacture various articles with the yellow sandal-wood, which is the most fragrant. They also burn it both in their temples and private houses as an incense, and especially in the form of long slender candles, which are formed by covering the ends of sticks with the sawdust of sandal-wood mixed with rice paste.—*Eng. Cyc.* In the Dekhan, this tree grows both in gardens and the jungles. It bears a small black berry, which if planted grows without any trouble. The wood is generally brought for sale in small logs seldom exceeding eighteen inches in length. —*Riddell.*

This very valuable tree is found in abundance on the Hills which separate the Coimbatore district from Mysore, whence it is brought to Coimbatore for sale.—*Wight.* Also, in abundance in Coorg and Mysore, and sparingly in Canara. It is usually cut into billets, and disposed of by weight. The scent is believed to be much modified by peculiarities of soil and elevation. (*Wight* No. 94, *Travancore* 263, *Mysore* 1, *Coorg* 3. *Masulipatam, Madras, Hort, Garden* 75, *Cleghorn, Mysore.*) *M. E. J. R.* It is chiefly remarkable for its agreeable fragrance, and as a preservative against insects. It is much used in making work boxes, walking sticks, penholders, and other small articles of fine ornament but cannot be procured of a large size.—*M. E. J. R.* Sandal wood is imported into Tenasserim from Hindustan, and is constantly for sale in the bazars, being a favorite cosmetic with Burmese ladies.—*Mason.*

(7369) SANTALUM ALBUM.

The oil.

Chendana nuna, Tel.; Chundana yennai, Tam.

Specimens of this oil were exhibited by the Salem and Canara Local Committees, the Madras Tariff, and Lieut. Hawkes. The exports amount annually to about 100 cwt.—*M. A. J. R.*

Santalum album Oil of the Seed. Sandal seed Oil. The seeds of the sandal wood tree yield by expression a thick and viscid oil which is burnt by the poorer classes in lamps.—*M. E. J. R.*

(7370) SANTALUM MYRTIFOLIUM is another species, or a strongly marked variety of *S. album*, found by Dr. Roxburgh in the mountains of the Rajamundry Circar, and which was figured by him in plate 2 of his 'Coromandel Plants:' it is distinguished by its opposite lanceolate leaves. The wood is of little value, according to Dr. Roxburgh, but Dr. Wallich says it is 'certe odoratissimum'. About 200 tons are annually imported into Calcutta from the Malabar coast, and about twice as much into Canton from the islands of the Indian Archipelago—*Eng. Cyc.* Dr. O'Shaughnessy says *Santalum myrtifolium* is synonymous with the S. album of Roxburgh's Coromandel plants, a native of the continent of India, Timor, &c. That it is a small tree, with yellow flowers in stalked, trifid, axillary cymes, leaves narrow and oval, and affords the sandal wood of Malabar. He adds that Roxburgh makes the Santalum album and S. myrtifolium two distinct species. His S. album thrives luxriantly in the Calcutta Garden, and is in flower and seed nearly the whole year.—*O'Shaughnessy, page.* 532.

(7371) SANVITALIA PROCUMBENS. A pretty compact plant, and from its nature adapted to cover a small patch or bed, in the flower garden, colour yellow, and raised from seed.—*Riddell.*

(7372) SAPAN WOOD. Cæsalpinia sapan.

Puttung, Guz. Hind.
Patonga, Sans.
Bukkum, Hind.
Isiapungum also Vuttunghy, Tam.
Sapang, Malay.
Sachang, Jav.
Samya, Mol.
Lolan, Amb.
Sibukas, Tagala.

The product of a thorny tree (*Cæsalpinia sapan*), indigenous to Siam, Pegu, the Philippine Islands, and the South of India. This wood is similar to Brazil wood, but contains less colouring matter, and is extensively used in India by native dyers. Sapan wood is imported into Bombay from Siam, and Singapore; and an inferior description, in small quantities, from the Malabar Coast. The former kinds are occasionally re-exported to London.—*Faulkner.*

Sappan Wood is an article of considerable commerce in the East. It is the bukkum wood of Scinde, and is procured in Mergui, Bengal, the Tenasserim Provinces, Malabar and Ceylon. In 1842 as much as 78,000 cwts. were shipped from Ceylon, but the export from thence has decreased. This island however, ships dyewoods annually to the amount of £2,000. A large quantity is exported from Siam and the Philippine Islands; as much as 200,000 piculs annually from the former, and 23,000 piculs from Manila. 3,524 piculs were shipped from Singapore in 1851, and 4,074 piculs in 1852. The picul is about one cwt. and a quarter. Sappan wood yields a yellowish colour, like that of Brazil wood (*C. brasiliensis*) but it does not afford of dye matter so much in quantity or so good in quality. It forms a large export from Ceylon: the shipments from thence were, in 1842, 77,694 cwt.; in 1843, 1,692; in 1844, 2,592; in 1845, 2,854. In 1837, 23,695 piculs of sappan wood, and 2,266 piculs of roots of ditto were shipped, and in the first six months of 1843, 22,326 piculs were exported from Manila; a large portion of this comes to Europe, but some goes to China, the United States, Singapore, &c. 15,500 picul were shipped from Manila in 1844, 5,250 ditto in 1845; and 1,210 tons in 1850. About 3,000 piculs of sappan wood and the same quantity of other dyestuffs are annually imported into Shanghae. The price of straight sappan wood at Shanghae in July last year, was thirty dollars per picul. In Calcutta, in June 1850, 4,000 piculs of the root of Manila sappan wood sold freely at about 7s. 6d. per factory maund, Siam ditto 6s. 75 tons were imported into Liverpool in 1849: and 120 tons in 1850, from Calcutta. The imports of sappan wood into the United Kingdom, in 1850 amounted to 3,670 tons, worth £8 to £12 the ton, and this continued the price in January 1853. Camwood, red sanders wood, barwood, and other dye woods, are found in great quantities in many parts of Africa. The dyes of Africa are found to resist both acids and light, properties which no other dyes seem to possess in the same degree. About thirty miles east of Bassia Cove, in the republic of Liberia, is the commencement of a region of unknown extent, where scarcely any tree is seen except the camwood. This boundless forest of wealth, as yet untouched, is easily accessible from that settlement; roads can be opened to it with little expense, and the neighbouring kings would probably give their co-operation to a measure so vastly beneficial to themselves. It is impossible to ascertain the exact amount of export of these commodities to Europe and the United States, but it is very great, and employs a large amount of vessels. One Liverpool house imported 600 tons in a single year, worth £9,000.

Dyewoods imported in 1850.	Tons.	Re-exported. Tons.
Logwood,	32,930	4,332
Fustic	9,808	1,771
Nicaragua,	7,909	112
Barwood,	1,896	1,229
Sappan,	3,670	—
Green Ebony, and Cocuswood,	1.457	—
Red Sanders,	656	—
Camwood,	416	—
Brazil and Brazillito	309	—
	59,051	7,444

Thus we perceive the annual consumption of heavy dyewoods in Britain in dyeing cotton, linen, woollen and silk goods, &c., exceeds in weight 51,000 tons.—*Simmonds.* Sapan-wood, or Buckum wood, (Cæsalpinia sapan,) is obtained from a species of the same genus that yields the Brazil-wood. It is a middle sized tree, indigenous to Siam, Pegu, the coast of Coromandel, the Eastern Islands, &c. It is imported in pieces like Brazil-wood, to which, for the purposes of dyeing, it is greatly inferior, it is generally too unsound to be useful for turning.—*Tredgold.* At the Madras Exhibition of 1855, specimens were exhibited in billets and chips from Tanjore, Travancore, Goa and Cuddapah. A red dye is made from an aqueous extract of the chips of this wood, but it is not reported to be a fast colour, and is principally used for common and cheap cloths. It is precipitated dark brown with iron, and red with alum.—*M. E. of* 1855. In the valley of the Tenasserim, between the latitudes of Tavoy city and the mouth of Tavoy river, the hills that border the valley on the eastern side abound in sappan wood, which is used extensively as a red dye. Considerable quantities are exported every year from Mergui, and that province is usually supposed to contain the tree, though it is really within the province of Tavoy; but the facility of water communication from the interior to Mergui, makes that the only port to which the wood is conveyed. It is rather singular that this narrow locality is the only one in the Provinces so far as I am aware, in which the tree is found. The tree has a much wider range, the Karens inform me, on the Meinam side of the mountain in Siam. More than five hundred thousand pounds have been exported from Mergui during some years between 1830 and 1840; but latterly the forests have not been so productive.—*Mason.* Sappan-wood. (Cæsalpinia sapan.) This dyeing material, the wood of a lowly tree, is found in many parts of the Malay and Philippine Archipelogos, but is most abundant in the island of Sumbawa, and in the provinces of Iloilo in Panay and Pangasinan in the great island of Luzon. In 1850, there were exported, chiefly to Europe and America, no less than 11,000 tons of this article from the port of Manilla. The Sappan-wood is the wild produce of the forests, and that it is indigenous wherever it grows there can be little question. It has, like many indigenous products a distinct name in the different languages, the only agreement, and this not perfect, being between the Malay and the Javanese, in the first of which it is called sapang, the origin of the European commercial and scientific names, and in Javanese sachang. In one language of the true Moluccas we have it as samya, and in another as roro, while in Amboynese it is lolan, and in the Tagala of the Philippines sibukas. It seems probable, however that the Cæsalpinias which produce the dyewood of countries which extend from the 9th degree of South to the 19th of North latitude, may be distinct species. The sappan-wood of Luzon is by from 40 to 50 per cent more valuable than that of Siam, that is, yields by so much more of colouring matter. In this respect all the Asiatic Cæsalpinias rank far below those of Brazil.—*Crawfurd, Dictionary, page* 376.

(7373) SAPINDACEÆ, *Soap-Worts*, a natural order of plants belonging to the calycose group of Polypetalous Exogens. It consists of trees or shrubs, rarely herbaceous plants, with erect or climbing stems, with alternate often compound leaves, rarely simple, with or without stipules, and often marked with lines or pellucid dots. Their inflorescence is racemose or paniculate, with small white or rose-coloured rarely yellow flowers, which are seldom barren or hermaphrodite. The calyx consists of 4-5 sepals, slightly cohering at the base. The petals are the same in number as the sepals, one being occasionally abortive. They are in general furnished with a petal-like scale, but are sometimes naked. They have a fleshy glandular disc occasionally occupying the base of the calyx. The stamens are definite, about twice the number of the sepals. The filaments are free or slightly connate, the anthers 2-celled. The ovary 3-celled, rarely 2-4-celled the cells containing 1-2-3 ovules. Style undivided, or more or less deeply 2- or 3-cleft. The seeds have usually an aril, are without albumen, and have a curved or spirally twisted embryo. They are inhabitants of most parts of the tropics, more especially of South America and India. They are not found in Europe or the United States of America. One genus is found in Australia, *Dodonea*.

This order is closely allied to *Aceraceæ*, from which they only differ in their alternate leaves and petals. The number of their stamens 8, with 5 unequal sepals, point out a relation with *Polygalaceæ*. Their climbing habit and tendency to produce tendrils give them a remote relation to *Vitaceæ*. In this order, although the leaves, branches, and other organs act in a deleterious manner, yet their fruit and seeds are eatable and wholesome. The Litchi and the Longan, favourite fruits in China, are produced by the genus *Euphoria*. These fruits are sweet, with a sub-acid flavour, and when dried are sometimes brought to this country. They are considered a great luxury in China, and are sent at a great expence from the provinces of Fokien and Quan-Tong, where they grow, to Peking, for the consumption of the emperor. Several other genera bear fruits which are very delicious, and are eaten in Japan and Brazil. *Sapindus* is remarkable for bearing a pulpy fruit, the outer part of which has been used, on account of its detergent properties, as a soap. Some of the species of this genus also produce eatable fruits. *Paulinia* is another genus which has poisonous properties residing in the leaves and other parts of the plant, whilst the fruits are eatable. The whole of the order partakes more or less of these properties.—*Eng. Cyc.* In China, The seeds of a Sapindus, besides their value in cleansing, are worn as beads "because," says the Budhists, "all demons are afraid of the wood," one native name means preventative of evil.—*Williams' Middle Kingdom*, p. 286.

(7374) SAPINDUS (contracted from *Sapo Indicus*, or Indian Soap), a genus of Plants belonging to the natural order *Sapindaceæ*, which has been so called in consequence of the berries of many of the species being employed for the same purposes as soap. The genus is tropical, containing between 20 and 30 species, which are found in the tropical parts both of the Old and New World. It is characterised by having the calyx 4-5-partite; petals as many as the sepals, a little longer, naked or hairy, or with a scale above the claw; torus or disc occupying the bottom of the calyx; stamens 8 to 10, inserted between the margin of the disc and ovary; ovary 3, rarely 2-celled; ovule 1, erect at the base of each cell; style with a 3-, rarely 2- lobed stigma, fruit fleshy, 1- 2-, rarely 3- lobed, each lobe, 1- 2-, rarely 3- seeded, with the seeds furnished with an aril. The species consists of trees having leaves without stipules, with the inflorescence in recemes or terminal panicles. Flowers small, white, or greenish-white. Berries all red and saponaceous, on which account they have been employed for washing woollens and cloths of various kinds in different countries. For instance, in the West Indies and the continent of America, *S. saponaria* yields the so-called soap-berries, and in Java, *S. Rarak*; so in India, several species, as *S. acuminatus*, *S. laurifolius*, *S. emarginatus*, and *S. detergens*, yield berries which are called Reetha, and in their dried state may be bought in every bazar, as they are everywhere employed as a substitute for soap. The fleshy part of these berries is viscid, and in drying assumes a shining semi-transparent appearance; when rubbed with water they form a lather like soap. The bark and root have similar properties, and have been employed for the same purposes, as well as medicinally, in the countries where they are indigenous. The berries, which are about the size of cherries, inclose black shining nuts, which used formerly to be much imported into England and employed as buttons for waistcoats, after having been tipped with gold, silver, or other metal. The kernel of these nuts contains an edible oil, which is sometimes employed for burning. The fruit of *S. Senegalensis* and of *S. esculentus* are eaten, and the wood of some species, as of *S. rubiginosus*, is close-grained and hard, and forms valuable timber.—*Eng. Cyc.*

(7375) SAPINDUS EMARGINATUS.

The Tree.

Rete ka jhar, HIND.
Poocha cotta marum, TAM.
Koonkoodoo chettoo, TEL.
Thaly marathoo, CAN.

The Wood.

Soap nut or koonkoodoo wood, ENG.
Koonkoodoo kurra, TEL.

The Nut.

Soap nut, ENG.
Koonkuda kaya. TEL.
Rete kee binj. HIND.
Ponnaung cottai. TAM.
Ritah, DUK.
Rishta, DUK.
Bindake HINDEE.
Arishta, Phenila, SANS.
Rarak, MALAY.

When this substance is mixed with water it froths like soap, and is used instead of that substance for many important purposes, Dr. Sherwood has mentioned that the seeds pounded with water often put an end to the epileptic paroxysm a small quantity being introduced into the patient's mouth. Another species, the *S. Saponaria*, has been used in medicine in the treatment of chlorosis, in the form of the tincture or extract of the soapy matter of the capsule. The nuts themselves are exceedingly hard and tough, and as they take a fine polish are employed for necklaces and beads. The kernels of the small black nuts of the S. Saponaria are eaten in the West Indies, and deemed as palatable as the hazel nut or almond. The roots as well as the capsules are used in washing, but it is stated that the fabric washed is rapidly corroded; this however requires confirmation. (Fee, vol. ii. p. 48.)—*O'Shaughnessy, page* 241. Wight suspects the Poochay Cottay marum, to be the same as Roxb. S. detergens. The fruit is used for the same purposes as indicated by the characterestic native name. His S. emarginatus may be a different plant as the fruit does not correspond. He does not know the wood further than that is white, said to be only fit for fuel.—*Wight.* Under the Canarese name of *Thaly Marathoo*, Mr. McIvor says that the Sapindus emarginatus is a small tree, wood elastic, strong and durable, common in Wynaad.—*McIvor, M. E. of* 1857.

(7376) SAPINDUS EMARGINATUS.

The oil

Poonga & Soapnut oil, Eng.
Poovandie cottay or Poongum-kai yennai, Tam.
Koocoodie noona, Tel.
Reethay ka tael, Hind.

This semi-solid oil is used medicinally by the natives, and is extracted from the kernel of the Soap-nut. Its cost prevents its general use.—*M. E. J. R.*

(7377) SAPINDUS FRUTICOSUS. Introduced into the Dekhan from the Moluccas, flowers in racemes.—*Riddell.*

(7378) SAPINDUS INDICUS.

Hooroa, Duk.

A small tree, flowers irregularly, fruit round and hard; three celled with a seed in each and which are used by the natives for intoxicating fish, the taste of the fruit is nauseous and the juice of the tree is considered poisonous.—*Riddell.* See Sapium Indicum.

(7379) SAPINDUS RUBIGINOSUS, Lin Rusty Soap nut tree.

Rusty soap nut, Eng.
Kookoodoo, Tel.
Ishy rashy, Tel.
Hseik-kyee, Burm.
Reetee ka jhar, Hind.
Manee poongum, Tam

A large timber tree which grows in the mountainous tracts of the Circars. The wood is very useful for a great variety of purposes being straight, strong and durable.—*Ains. Mat. Med. p.* 213. The Ishki rashy yields a useful timber but so full of sand, particularly near the bark, that it injures tools employed on it.—*Rohde.* The wood of this tree is useful for a great variety of purposes, being large, straight, strong, and durable, towards the centre, it is chocolate colored, its name is derived from the quantity of silex or sand it contains particularly near the bark and which injures tools used in working it: when dry it has something the appearance of Teak.—*Rohde M. S. S.* In Pegu, this tree is not very plentiful. It is found in the Pegu district, where it attains a girth of three or four feet, growing all in proportion and straight. Wood, white-colored, adapted to every purpose of housebuilding.—*McClelland.*

7380) SAPINDUS SAPONARIA. Aritha, Ritha, Soapnut. The dried berries are brought o Ajmere from Kotah, Malwa, and Mewar, they are not used in medicine; but are much employed in dyeing, and as a detergent: eight seers are sold for the rupee.—*Gen. Med. Top. p.* 122.

(7381) SAPIUM, a genus of Plants belonging to the natural order *Euphorbiaceæ.* The flowers are monœcious, the calyx bifid and 3-toothed, the style trifid, and the capsule 3-coccous.—*Eng. Cyc.* Wight gives Sapium baccatum, 1950-2; Indicum, 1950.

(7382) SAPIUM INDICUM, Roxb. iii. p. 692.

Hooroona, Beng.

Grows in the Delta of the Ganges. *S. Indicum* has alternate stalked leaves somewhat pendulous, broad, lanceolate, serrate, smooth, and of a deep shining green, from 2 to 4 inches long, and broad in proportion; the stipules small and deciduous; the calyx is 3 parted, the divisions somewhat cordate and expanding; the filaments longer than the calyx, the anthers ovate; the female flowers at the base of the catkins often solitary; the capsule or nut is globular, of the size of a nutmeg, 3 celled, 6-valved, thick, and exceedingly hard; the seed is solitary, affixed by the apex, oval, and smooth. The juice of this species, like the former, is highly poisonous. (Lindley. *Flora Medica*; Burnett, *Outlines of Botany*) —*Eng. Cyc.* Capsule or nut globular, size of a nutmeg, 3 celled, 6-valved, thick and exceedingly hard, seed solitary, fixed by apex, smooth, juice very poisonous, taste exceedingly nauseous, seeds used for intoxicating fish. *Roxb—O' Shaughnessy, page* 562.

(7383) SAPIUM SEBIFERUM. Tallow Tree. This tree is not very common in the Dekhan, and is only to be met with in a few gardens. It is an ornamental tree, and bears flowers and fruit for the great part of the year together. The fruit is of a pear shape, yellow and red, which when ripe opens and displays two or three black seeds enveloped partially with a fatty-looking substance. It is from this the Chinese extract the tallow and make into candles.—*Riddell.*

(7384) SAPODILLA PLUM. Achras Sapota. In Tenasserim, in a few European gardens may be found the tree which produces the Sapodilla plum: whose "fruit, in appearance like an old decayed potato, is yet the most luscious in the West Indies."—*Mason.*

(7385) SAPONACEOUS PLANTS. Many tropical plants furnish useful substitutes for common soap. The aril which surrounds the seed and the roots of *Sapindus Saponaria*, an evergreen tree, is used as soap in South America and the West Indies under the name of soap berries. The seed vessels are very acrid, they lather freely in water and will cleanse more linen than thirty times their weight of soap, but in time they corrode or burn the linen. Humboldt says that proceeding along the river Carenicuar, in the Gulf of Cariaco, he saw the Indian women washing their linen with the fruit of this tree, there called the parapara. Some other species of *Sapindus* and of *Gypsophila* have similar properties. The bruised leaves and roots of *Saponaria officinalis*, a British species, form a lather which much resembles that of soap, and is similarly efficacious in removing grease spots. The bark of many species of

Quillaia, as Q. *saponaria*, when beaten between stones, makes a lather which can be used as a substitute for soap, in washing woollens and silk clothes, and to clean colors in dyeing, in Chili and Brazil, but it turns linen yellow. The fruit of *Bromelia Pinguin* is equally useful. A vegetable soap was prepared some years ago in Jamaica from the leaves of the American aloe (*Agave Americana*) which was found as detergent as Castile soap for washing linen, and had the superior quality of mixing and forming a lather with salt water as well as fresh. Dr. Robinson, the naturalist, thus describes the process he adopted in 1767, and for which he was awarded a grant by the House of Assembly:—"The lower leaves of the Curaca or Coratee (*Agave karatu*) were passed between heavy rollers to express the juice, which, after being strained through a hair cloth, was merely inspissated by the action of the sun, or a slow fire, and cast into balls or casks. The only precaution necessary was to allow no mixture of any unctuous materials, which destroyed the efficacy of the soap. A vegetable soap, which has been found excellent for washing silk, &c, may be thus obtained. To one part of the skin of the Ackee add one and a half part of the *Agave karatu*, macerated in one part of boiling water for twenty-four hours, and with the extract from this decoction mix four per cent. of rosin. In Brazil, soap is made from the ashes of the bassura or broom plant (*Sida lanceolata*) which abounds with alkali. There are also some Soap barks and pods of native plants used in China as substitutes for Soap. The bark of Quillaia Saponaria renders water frothy, and is used as a detergent by wool dyers. Saponaria vaccana is common in India. The pericarp of Sapindus emarginatus mixed with water, froths like soap. Saponaceous berries are found in Java. The Sapindus is used as a substitute for soap, as Sapindus acuminata, laurifolius emarginatus, and detergens, all of them. East Indian plants are similarly used.—*Simmonds, p.* 575.

(7386) SAPONARIA (from the Latin 'sapo,' soap,) so called because the bruised leaves are said to produce a lather like soap when agitated in water), a genus of Plants belonging to the natural order *Caryophyllaceæ*. It has a 5-toothed calyx naked at the base, 5 clawed petals, 10 stamens, and 2 styles; the capsules are 1-celled, opening at the top with 4 valves; the seeds are globular or reniform. The genus SAPONARIA includes an article well known in India, the *Saponaria vaccaria*. The properties of this plant are identical in every respect with those of the *S. officinalis*, or soap wort, the Στρουθιον of Dioscorides. The taste of the entire plant is bitter, the roots are cylindrical, two to three feet long, the thickness of a swan quill, branching above, epidermis ruddy, thick, and easily separable: parenchyma white and solid. The taste of the root is bitter and mucilaginous; the infusion is blackened by salts of iron, and the decoction froths like a solution of soap. According to Bucholz' analysis, these properties are due to the presence of a mucilaginous extractive called *saponine*, regarding which an additional notice will be found under the head of *Sapindus emarginatus.*—*O' Shaughnessy, page* 212. All the species of this genus are very ornamental. *S. ocymoides* is one of the most elegant plants we have in our gardens, and is well adapted for rock-work. (Don, *Dichlamedeous Plants*; Babington, *Manual of British Botany*; Burnett, *Outlines of Botany.*)—*Eng. Cyc.*

(7387) SAPONARIA PROCUMBENS. This is a pretty genus of rose coloured, pink or yellow flowers, and from its trailing habit, best suited for covering rock work, cultivated from seed.—*Riddell.*

(7388) SAPOO. A soft, firm, but rather open though even grained, light Ceylon wood.

(7389) SAPOOMIDILE. A soft rather coarse, open grained light Ceylon wood.

(7390) SAPOTACEÆ, OR SAPOTEÆ. Sapotads, a natural order of Plants belonging to the polycarpous group of Monopetalous Exogens. It consists of trees and shrubs, which abound with a milky juice; the branches are round; the leaves alternate, simple, entire, coriaceous, destitute of stipules, their under sides being covered by a silky or downy pubescence. The flowers are axillary, regular, and united; the calyx is 4-8-cleft, imbricate in æstivation; the corolla is hypogynous, regular, and cleft; the lobes are equal in number to the sepals and alternate with them; the stamens are definite and distinct, some are barren and some fertile, the former being alternate with the sepals, the latter opposite; the ovary is superior, with several cells, in each of which is one erect ovule; style simple; stigma undivided; seeds nut-like, sometimes cohering, unto a several-celled putamen; embryo large erect, and inclosed in fleshy albumen. This family of plants is most nearly allied to that of *Ebenaceæ*, with which it agrees in habit, its monopetalous regular hypogynous corolla, the absence of a hypogynous disc, its several-celled ovary, and definite ovules and stamens. It differs however in the possession of milky juice, soft wood, hermaphrodite flowers, undivided stigma, and one seeded ovary with erect ovules. The plants of this family are chiefly natives of India, Africa, and America. Some of the species produce fruits which are much prized as articles of diet. Amongst these is the Sapodilla Plum, or Naseberry, which is the produce of *Achras sapota*. The Star-Apple (*Chrysophyllum*). Marmalade (*Achras mammosa*), the Medlar of Surinam, and other eatable fruits, are derived from plants belonging to this order. Most of the species yield large quantities of a milky juice which, unlike the secretions of most lactescent families of plants, may be used for alimentary purposes. The fruit and seeds abound in oil, which is solid like butter, and has a mild pleasant flavour. The bark of some species of *Achras* is astringent and tonic, and has been recommended as a substitute for quinine. [Achras.]—*Eng. Cyc.*

(7391) SAPOTA ELENGOIDES. A large tree common on the Neilgherries; wood strong and elastic, and like the hawthorn, burns well when green.—*McIvor. M. E. J. R.*

(7392) SAPOTEÆ, is a natural order of Trees or shrubs, with simple and alternate leaves, flowers solitary, or in fascicles at the axillæ of the leaves, gorged with a milky white juice. No individual of this order is really dangerous, the juice being devoid of acrid or irritating properties. The barks of many species are astringent, the fruits pulpy, acidulous, and edible. The seeds contain an oil rich in stearine. The butter tree of India, and of Mungo Park. *Bassia butyracea*, is one of this family. It also contains the *Sideroxylon*, or iron wood. The *Achras Sapota*, Sapodilla plum, has delicious fruit with very bitter seeds, believed in Martinique to be powerfully diuretic. The bark is deemed a substitute for cinchona, (Lindley Fl. Med. p. 388.)—*O' Shaughnessy, page* 427.

(7393) SAPPHIRE.

Saffiersteen, Duts.
Saphir, Fr.
Sapphir, Ger.
Zafiro, It.
Sapphirus, Lat.
Jachant, Rus.
Safiro, Safir, Sp.
Neelum, Tam. and Hind. Duk.
Sufeer, Arab.
Nilam, Malay.
Neel, Cyng.

A beautiful precious stone, and, after the diamond, the most valuable of gems. The colours are blue, red, gray, white, green, and yellow; the most highly prized varieties however, are the crimson and carmine red. Localities, Pegu, France, Germany, and Ceylon.—*Faulkner.* There are several varieties, the names of which are dependant chiefly upon their colour: the *White Sapphire*, which is transparent or translucent; the Oriental Sapphire, which is blue; *Oriental Amethyst* which is purple; the *Oriental Topaz*, yellow; the *Oriental Emerald*, green: and some other varieties occur, as the *Chatoyunt* and the *Opalescent Sapphire.—Eng. Cyc. page* 151. Speaking of one of the minerals to which the term Sapphire is applied, Ainslie remarks, this is no other than the Patje Padian or Green Sapphire, in fact the green Sapphire of Werner, and is a stone altogether different from the occidental Emerald, which is known only to exist in South America. The oriental gem is however harder than the American, though inferior in the richness and purity of its green colour. Emeralds are by Mr. Franklin's account found in the dominions of Ava; though Mr. Symes in his Embassy to Ava, tells us that they absolutely never are met with in any part of that country.—*Ainslie.* At another place, he says the best sapphires to be met with in India are brought from the Burman dominions, those found in Ceylon, though genuine, are much less beautiful. On that Island the green Sapphire (Patje Padian) (Cyng) is common —*Ains. Mat. Med. page* 166. According to Tomlinson, *Sapphire* is a gem of a blue colour consisting of pure alumina; it occurs in six-sided prisms often with uneven surfaces. It also occurs granular. When the surface is polished, a star of six rays corresponding with the hexagonal form, is in some specimens seen within the crystal. The sapphire ranks next to the diamond in hardness. When it occurs in *dull dingy-coloured* crystals and masses, the term *corundum* is applied to it, and the granular variety of bluish grey and blackish is called *emery.* [See Corundum; Emery.] When the sapphire occurs of other *bright* tints, other names are applied to it. The application of the sapphire to the jewelling of watches is well known. Some of the varieties of the sapphire rank next to the diamond in value. Indeed the oriental ruby, of fine colour and free from flaws, is more valuable than a diamond of equal weight. In Mr. Hope's collection is a blue sapphire which cost 3,000*l.*—*Tomlinson.*

(7394) SAPPHIRE, BLUE. Blue sapphires are brought from Burmah, and Dr. Helfer writing from Mergui says: "A Karen informed me, there are precious blue stones to be had, which the Shans collect and carry to Bangkok. He described the place as eight days' distant, and did not know whether it was British or Siamese." —*Mason.* See Schorl, also Tourmaline.

(7395) SAPPHIRE, GREEN, or ORIENTAL EMERALD. The green gem is often seen for sale among the Burmese, brought from Burmah, which Europeans usually call emerald; but it is probably a blue sapphire. The true emerald may however be among them.—*Mason.*

(7396) SAPPHIRE, RED, or ORIENTAL RUBY. The red sapphire, or ruby, is brought from Burmah, where it is found with the common blue sapphire, probably in the valley of the Salwen. The Burmese call it by the same name that they do the precious garnet, and do not appear to be always able to distinguish them. —*Mason.*

(7397) SAPPHIRE, VIOLET. The violet sapphire, or Oriental amethyst, is found in the same localities as the common sapphire.—*Mason.*

(7398) SAPPHIRE, YELLOW. The most valuable topaz in Burmah, is the yellow sapphire, or Oriental topaz.—*Mason.*

(7399) SARAPUPPOO NUT. Buchanania Latifolia.

(7400) SARCOCOCCA TRINERVIA; or Neilgherry Box Wood. Tree very common on the Neilgherries ; wood hard durable, might be used as common Box wood in the Arts.—*McIror. M. E. J. R.* 1857.

(7401) SARCOCOLLA. Lin. Now of the *Natural order* PENÆALEÆ., Sarcocolla (Ungeroot, *Arab*, Runjudeb, *Pers*, Dioscor. lib iii.)

Unzeeroot, ARAB.
Runjudeb, PERS.

A subacid, sweetish, and somewhat nauseous, gum resin, produced in North Africa, Persia, and Arabia, by a shrub, the *Penaea sarcocolla*. It is met with in small whitish-yellow grains, and is celebrated for agglutinating wounds It is rarely met with in India.—*Faulkner*. It is yellow, or reddish, like gum arabic, in oblong globules, the size of a pea or of grains of sand, friable, opaque or semitransparent, softening but not melting by heat ; sp. gr. 1268. Sarcocolline is half transparent, crystalline, brittle, like gum, soluble in 40 parts of cold water and 25 of boiling water, soluble also in alcohol. Odour weak and peculiar, taste saccharine and slightly bitter ; composition, carb. 22, hyd. 19, oxy. 10, atoms. Sarcocolla was once deemed a powerful healer of wounds σανξ fleshy, and κολλα glue), but this idea has been long abandoned. It is rarely met with in India, and then only brought from Persia and Arabia. Mesure regarded it as cathartic.—*O' Shaughnessy, page* 427.

(7402) SARCOSTEMMA (from σάρζ, flesh, and στέμμα, a crown, in reference to the leaflets of the inner corolla being fleshy), a genus of plants belonging to the natural order *Asclepiadaceæ*. It has a rotate corolla a coronet of double stamens : the outer one cup-shaped or annular crenated, the inner one 5-leaved, higher than the outer one, with fleshy segments ; the stigma is nearly blunt ; the follicles slender and smooth and the seeds comose. The species of the genus are natives of Australia and the East Indies, as well as of South America.—*Eng. Cyc.* Wight gives Sarcostemma brevistigma, ? 595 ; Brunonianum, 1282 ; intermedium, 1281 ; and viminale, 545.

(7403) SARCOSTEMMA GLAUCUM, Glacous-Leaved Scarostemma, is a lactescent smooth twining herbaceous plant. The leaves are lanceolate, short-stalked slightly revolute, membranous, being with the midrib prominent or the under side, which is glaucous ; the umbels are many-flowerd between the petioles, on very long peduncles ; the segments of the calyx lanceolate, ciliated, and acuminate ; the corolla white, with a large fleshy annular wavy coronet ; the segments of the corolla fringed and spreading.—*Eng. Cyc.*

(7404) SARCOSTEMMA VIMINALE. APOCYNACEÆ.

Soom, DUCK.

A valuable leafless plant, resembling the Euphorbia Tirucalli ; flowers white in the rains, the natives tie the stems up into a bundle and place them in the watercourse of their wells for the purpose of preventing the attack of white ants.—*Riddell.*

(7405) SARCOSTIGMA KLEINII. Poovana Oil was exhibited by the Tinnevelly and Travancore Local Committees, and by the Rev. E. Johnston, Cottayam, and is reported to be useful in Rheumatism. *M. E. J. R.*—The Revd. E. Johnstone of Cottayam forwarded a specimen of the oil of *Sarcostigma Kleinii*. This substance has been long known under the name of Poovana and Poovengah, but this exhibitor was the first to ascertain its correct Botanical name. This medicinal oil is used largely on the Western Coast, and seems especially to merit further investigation.—*M. E. J. R.*

(7406) SARD, SARDONYX.

(7407) SARDINES.

Sardines, FR.
Sasdellen, GER.
Sardine, IT.
Sardinas, SP.

A species of anchovy common in the Mediterranean. They are met with in commerce in a preserved state.—*Faulkner.*

(7408) SARDINE : ENGRAULIS MELETTA ? There is a small fish of the herring family at Tavoy and Mergui, which I have not examined, but Dr. Morton thinks it is identical, or nearly related to the common sardine, a fish of the same genus as the anchovy.—*Mason.*

(7409) SARDONYX. A species of agate, being a variety of onyx, in which the opaque white alternates with a rich deep orange brown, of considerable transparency. The finest are brought from the East. (*Waterston.*)—*Faulkner.* Sardonyx is a variety of onyx which is supposed by some to have received its name from having been brought from Sardes, in Lydia By others it has been said that the name comes from Sardo, the Greek name of Sardinia, there being some reason for thinking that the Carthaginians brought the stones from that island, and exported them during their occupation of it. In this the opaque white alternates with a rich deep orange brown of considerable translucency, and as this is of rare occurrence the sardonyx is of greater value. The finest are brought from the east, and some antique gems are formed of them.—*Eng. Cyc.*

(7410) SARSAPARILLA.

Muckwy, ARAB.
Erramasoomul, Irimusa, CYNG.
Salseparcille, FR.
Sarsaparille, GER.
Salsapariglia, IT.
Sarza, LAT.
Shariva, SANS.
Zarzaprilla, SP.
Nunnarivayr, TAM.

Sarza, L. E. Sarsaparilla, D. Radix, L. D. Root of Smilax officinalis. *Humb.* and *Bonpl.* L. E., and probably of other species E. of Smilax Sarsaparilla, *Linn.* D. Sarsaparilla.

(7411) *Sarsaparilla*, the roots of several species of climbing evergreen plants found mostly in warm and tropical climates, and belonging to the genus *Smilax*. The name sarsaparilla is derived from the Spanish word *zarza*, a bramble, and *parilla*, a vine. The original species, *Smilax officinalis*, is a native of South America, but there are several other kinds which also contribute to furnish the roots known in commerce as genuine sarsaparilla, and whose properties are scarcely inferior to it. Of the South American sarsaparilla some reaches us by way of Jamaica and has the name of that island, while a large quantity is shipped at the Brazils and is called Lisbon sarsaparilla. Varieties of this root are also found in the South of Europe and in India. East Indian Sarsaparilla, long thought to be the root of *Smilax aspera*, but now said to belong to *Hemidesmus Indicus*, is abundant and cheap, and as it appears to partake largely of the qualities of the true sarsaparilla, there is no doubt of its being extensively employed as a substitute. The Smilax China is also largely employed. Sarsaparilla is valued as a restorative to debilitated constitutions. According to Brande there is as yet no good analysis of this root, and the extraordinary medical qualities which it is said to possess are to be attributed rather to its general composition than to any distinct principle.—*Tomlinson*.

The word *Smilax* occurs in Greek authors,and the plant *Smilax aspera*,continues to be employed in medicine. The name Sarsaparilla (from the Spanish *Sarsa*, a bramble, and *Parilla*, a vine) is applied to species of the same genus, and to their roots, first introduced into Europe from the New World in the 16th cenutry. Several kinds, as Jamaica, Honduras, Brazilian, &c., are known in commerce; but it is extremely difficult, if not impossible, at present to determine the species of *Smilax* which yield the several varieties of drug, because much of it is brought over by the Indians from the little known Mosquito coast to Jamaica, and thence imported into England. the greater portion of the remainder is imported from Mexico, Guatimala, Brazil, and Peru.—*Royle*.

(7412) *Smilax officinalis*, *H. B.* and *K.*, was discovered by Humboldt and Bonpland in New Granada on the banks of the Magdalena, in Columbia. As its roots are collected by the natives, called *Zarzaparilla*, and taken to Cartagena, and thence exported to Jamaica, it is more than probable that this yields some of the Sarsaparilla of commerce; hence it is adopted in the L. and the E. P. Dr. Pereira concludes it to be probably the source of Jamaica Sarsaparilla. Martius states that, according to Pohl, the roots are collected in the western parts of the province of Minas Geraes.—*Royle*.

(7413) *Smilax Sarsaparilla*, *Linn.* D., a native of the United States of America; but it does not, according to the evidence of American authors (*v*, Wood and Bache), yield any of the Sarsaparilla of commerce.

(7414) *Smilax Papyracea*, *Poir.* (S. syphilitica, *Mart.* non Humb.) is a native of Brazil. Martius ascertained that its roots were collected by the Indians on the Rio Negro and other places in the vicinity of the Amazon river, and that they form the *Salsa*, *Salsaparilla*, *Sarza*, or *Zarza*, which is named the Sarsa of Maranhao, of Para, and of Lisbon, and that it abounds more than the other in Parigline. Ejus radices præ cæterarum Smilacum pollent materia illa extractiva, saporis amaricantis, fauces vellicantis, *Parillinum* dicta, cui efficacia medicaminis præcipue debetur."—*Royle*.

(7415) *Smilax Syphilitica. Willd.*, is a distinct species, found by H. and B. on the Rio Cassiquiare, in Brazilian Guiana.—*Royle*.

(7416) *Smilax Medica*, *Schlecht*, was found by Schiede on the eastern slope of the Mexican Andes. The roots are dried and exported from Vera Cruz, but are little known here. Dr. Hancock states that there is but one species that yields genuine Sarsaparilla which manifests to the taste any of the sensible properties of Sarsaparilla; and this grows chiefly on the elevated lands of the Rio Imiquem, at Unturana and Caraburi; also that the Sarsa of the Rio Negro, which comes by way of Angostura or Para, is the best. This is probably yielded by the above *S. papyracea*. Several other species are, however, enumerated by Martius, as *S. Japicanga*, *brasiliensis* and also *Herreria Salsaparilha* as employed for the same purposes, and says " Recentes multo efficaciores, quam exsiccatæ, vetustæ." So *S. Cumanensis* the *Azacoreto* of the natives, *S. Cardato-ovata* of Poppig, *S. Purhampuy*, referred doubtfully to *S. officinalis* by Dr. Lindley, *S. China* yielding the *China-root* of the shops, long famed in the East. It is probable that some of the Indian species are possessed of similar virtues. (*v. Himal. Bot. p.* 383.) —*Royle*. It will have been seen from the foregoing observations that the root of various species of *Smilax* constitutes the sarasparilla of the shops. Sarsaparilla is used in decoction and infusion as a tonic and alterative. The following are enumerated as sources whence sarsaparilla of various kinds is derived.—*Simmonds*.

(7417) *Smilax China* and *sagittæfolia*, yielding the Chinese root, are said to come from the province of Onansi in China.

(7418) *Smilax pseudo China*, *S. Sarsaparilla*, *S. rubens*, and *S. Watsoni*, furnish the drug of North America. The sarsaparilla distinguished in commerce as the Lisbon or Brazilian is the root of *S. papyracea* of Poiret. It is an undershrub, the stem of which is compressed and angular below, and armed with prickles at the angles. The leaves are elliptic, acuminate, and marked with three longitudinal nerves. This species grows principally in the regions bordering the river Amazon, and on the banks of most of its tributary streams. It is generally brought from the provinces of Para and Maranham. It is in large cylindrical bundles, long and straight, and the flexible stem of the plant is bound round the bundles, so as to entirely cover them. Its fibres are very long cylindrical, wrinkled longitudinally, and furnished with some lateral fibrils. Its color is of a fawn brown, or sometimes of a dark grey, approaching to black. The color internally is nearly white. Besides this species there are others indigenous, such as *S. officinalis*, which grows in the province of Mina ; *S. syphilitica*, which grows in the northern regions, and three new species, *S. sapicanga*, *S Brasiliensis*, and *S. Sarsaparilla* of India.—*Simmonds*. The roots of *Hemidesmus Indicus* were sent to the Madras Exhibition of 1855 from almost every district, but they varied considerably in aroma, the bundle from Trichinopoly being the best. A Syrup and extract from the indigenous plant, growing at the foot of Courtallum hills by 1st Dresser C. Appavoo Pillay, Tinnevelly. Dr. A. J. Scott forwarded a crystallized principle called "Hemidesmine," which was found on examination to be an entirely new substance, exhibiting a remarkable indifference both to acids and alkalies, crystallizing in a peculiar manner in hexagonal plates, which are subject to rapid efflorescence. The only ascertained solvents are alcohol and ether ; it is perfectly insoluble in water, both cold and hot. These facts show that it is a substance of a very peculiar nature. The jury recommended that this preparation be fully tested in hospital practice, along with the extract and syrup prepared from the same plant, and forwarded by 1st Dresser C. Appavoo Pillay. In consideration of Hemidesmine being a new product, the jury awarded a 1st class medal to Dr. Scott, and to C.Appavoo Pillay, Honorable Mention—*M. E. J. R.*

(7419) SARSAPARILLA. Two plants used as such, are common on the slopes of the Neilgherries, the *Hemidesmus Indicus*, and *Ichnocarpus frutescens*, both used as Sarsaparilla.

(7420) SARSAPARILLA. Simple and Compound Decoction of Sarsaparilla, In preparing these decoctions when Sarsaparilla is not obtainable, the China root, (Smilax China,) may be employed.—*Beng Phar, page* 279. An infusion of the Hemidesmus Indicus, (Ununtamul,) is a still better substitute for sarsaparilla. But as much of the virtues of the Ununtamul depend on a volatile principle, it should not be used in decoction, as the long boiling dissipates the active ingredient. For the Mezereon of the London Pharmacopeia, (Daphne mezereon) the dried bark of the Nepal paper plant, Daphne cannabina, may be substituted. The bazar mezereon is almost always inert from age.—*Beng Phar*, *page* 279. The Assam Sassafras perhaps the bark of Camphora glandulifera is fully equal to the American kind, and may be introduced accordingly, although its source is as yet not perfectly ascertained. Lastly, for liquorice, the goonch, root of Abrus precatorus, may be substituted in this as in many other preparations. —*Phar. p.* 279.

(7421) SARSAPARILLA, SYRUP OF SARSAPARILLA ; SYRUPUS SARZÆ. According to the same formula with which it is prepared may be made syrup of Hemidesmus.—(Ununtamul.) Syrup of China Root,—(Chob China.) These three preparations are alterative and diuretic, and are used to sweeten the decoctions and infusions of the same articles.—*Beng. Phar. page* 409.

(7422) SASSAFRAS. Root of Laurus sassafras, or Sassafras officinale.

Sasafras, ARAB.	Sassafraso, IT.
Cay-Vang-dee, COCH-CHIN.	Sassafras LAT.
Sassafras, FR.	Sassafras, SP.
Sassafras, GER.	

Sassafras, a genus of Plants belonging to the natural order *Lauraceæ*. This is one of the genera into which the old genus *Laurus* of Linnæus has been divided by Nees von Esenbeck and other botanists. It is known by its deœcious flowers, 6-parted membranous calyx, with equal segments permanent at the base. The barren flowers have 9 stamens in 3 rows, the 3 inner with double-stalked glands at the base ; the anthers linear, 4-celled, with their faces turned inwards. The fertile flowers have sterile stamens, which are fewer than, or as many as in, the barren flowers. The fruit is succulent, placed on the thick fleshy apex of the peduncle, and seated on the torn unchanged calyx. The leaves are deciduous. Flowers yellow. The species of this genus most known is the *S. officinale*, the Sassafras Laurel, on account of its medicinal virtues. It is an inhabitant of the woods of North America, from Canada to Florida. It is mostly a small tree or bush, but sometimes attains the height of 40 or 50 feet. Its flowers are arranged in naked downy racemes, which open before the leaves appear, and are furnished with subulate deciduous bracts. The leaves are membranous, bright green, smooth above, finely downy beneath, very variable in form, and tapering in a wedge-like manner into the petiole. The fruit is of a bright blue colour, as large as a small cherry, and seated upon red clavate peduncles. In America, the Sassafras is divided into two varieties, the red and white. Its great use is for medicinal purposes. It is however employed in America for making bedsteads and other articles of furniture, which are not liable to the attacks of insects, and give out a very agreeable odour.—*Eng. Cyc.*

(7423) SASSAFRAS. A species of Sassafras abounds in the Tenasserim jungles, which seems to possess all the properties of the sassafras of America. Mason never met with the tree in fruit or flower, but the leaf shows that it is not the *Sassafras officinarum*.—*Mason*.

(7424) SASSAFRAS. LAURUS (SASSAFRAS.?) A species of laurus with the odour of sassafras, is in Tenasserim, often used in house carpentry. —*Mason*

(7425) SASSAFRAS OF ASSAM, is perhaps the bark of the Camphora glandulifera. It is fully equal to the American kind, and may be introduced accordingly, although its source is as yet not perfectly ascertained.—*Beng. Phar. p.* 279.

(7426) SASSAFRAS PARTHENOXYLON, is a lofty timber-tree growing in the forests of Sumatra The bark is rough and brown. Leaves alternate, rather long, petioled, ovate, acute, often acuminate and varying in breadth, about 3 inches long, entire, with somewhat revolute edges, smooth, glaucous beneath; nerves lateral and irregularly alternate. The fruit has a strong balsamic smell, and yields an oil, considered useful in rheumatic affections. An infusion of the root is used in medicine.—*Eng. Cyc.*

(7427) SASSAFRAS-WOOD, is a species of laurel (sassafras officinalis;) the root is used in medicine. The small wood is of a light brown, the large is darker; both are plain, soft, and close. Sassafras-wood measures from 4 to 12 in. diameter; it is sometimes chosen for cabinet work and turning, on account of its scent.—*Tredgold.* At the Madras Exhibition of 1855, the Jury remarked two specimens of a somewhat rare wood, "Sassafras" both from Mergui. The wood is very fragrant, and contains an essential oil of value in medicine.—*M. E. J. R.*

(7428) SATIN.

Satin, FR.	Raso, IT.
Atlass GER.	Setim, PORT.

A term applied to a soft, closely woven, twilled, silken fabric, with a glossy surface. Satins re either plain or figured, and are made of all colours.—*Faulkner*.

(7429) SATIN WOOD. SWIETENIA CHLOROXYLON. A cabinet wood, well known for its glossy yellow shades. *Satin wood* is hard in its character, and when polished it is very beautiful and has a satiny lustre, t is much used for picture frames, rivalling he birds eye maple of America. It is occasionally used by cabinet makers for general furniture, but it is liable to split.—*M. E. J. R.* The best variety is the West Indian, imported from St. Domingo, in square logs and planks rom 9 to 20 inches wide; the next in quality is he East Indian, shipped from Singapore and Bombay in round logs from 9 to 30 in. diameter; nd the most inferior is from New Providence, in sticks from 3½ to 10 in. square; the wood is close, not so hard as box-wood, but somewhat like it in colour or rather more orange; some pieces are very beautifully mottled and curled. It was much in vogue a few years back for internal decoration and furniture, it is now principally used for brushes, and somewhat for turning, the finest kinds are cut into veneers, which are then expensive, the Nassau wood is generally used for brushes. Satin-wood of handsome figure was formerly imported in large quantities from the Island of Dominica. The wood has an agreeable scent, and is sometimes called Yellow Saunders.—*Tred.*

(7430) SATURNIA, a genus of Insects belonging to the order *Lepidoptera* and the family *Bombycidæ*. The antennæ are fringed in the male; the head is small; the wings are very broad and entire; the palpi and trunk are wanting.—*Eng. Cyc.* To the genus *Saturnia* some of the largest of the *Lepidoptera* belong. *S. Atlas*, the Giant Atlas Moth, has wings measuring 7 or 8 inches across. This species also, with *S. Cercropia* and *S. Luna*, have their wings produced into a tail. The cocoons of *S. Cynthia* and *S. Mylitta* are used in India for the production of silk. Latreille states that these are the wild species of silk-worm of China. *S. Cynthia* is the Arrindi Silk-Worm of India. (Roxburgh, 'Linn. Trans.,' vol. vii.) *S. Promethea*, a North American species, forms its cocoon within the leaf of a sassafras-tree, having previously fastened the stalk of the leaf to the stem by a strong silken web, whereby it is prevented from falling with the other leaves. (Westwood.)

(7431) SATURNIA PAVONIA MINOR, the Emperor Moth, is one of the handsomest of the British species of Moths It is about 3 inches wide. The colour is grayish-brown, faintly tinged with purple; the hinder margin of all the wings has a band of pale brown and purple, the hinder band being much waved. The centre of each wing has a large spot or ocellus, which is placed on a light ground; it consists of a black pupil, with a yellow or gray iris, and partially surrounded by a light blue crescent. The larva is of a green colour, having a black band on each segment, adorned with pink tubercles, bearing a whorl of six hairs diverging like a star. It constructs a curious cocoon, the extremity not being close, but terminated by a converging circle of very stiff hairs, which enables the insect to make its escape from within, but completely prevents all ingress.—*Eng. Cyc.*

(0432) SAUCE. Out of eighteen red sauces submitted by Dr. Hassell to examination in 1852, no less than sixteen contained Bole Armenian, and this usually in immense quantites.—*Hassell.*

(7433) SAUSSUREA GOSSYPINA, In East Nepaul at the summit of the Wallan Choon pass, at an elevation of 16,748 feet, above the sea, the plants gathered by Dr. Hooker near the top of the pass were species of *Compositæ*, grass, and *Arenaria*; the most curious was Saussurea Gossypina, which forms great clubs of the softest white wool, six inches to a foot high, its flowers and leaves seeming uniformly clothed with the warmest fur that nature can devise. Generally speaking, the alpine plants of the Himalaya are quite unprovided with any special protection of this kind; it is the prevalence and conspicuous nature of the exceptions that mislead, and induce the careless observer to generalise hastily from solitary instances; for the prevailing alpine genera of the Himalaya, *Arenarias*, primroses, saxifrages, fumitories, *Ranunculi*, gentians, grasses, sedges, &c. have almost uniformly naked foliage.—*Hooker, Him. Jour. Vol.* 1. *p.* 225.

(7434) SAUNDERS WOOD : RED WOOD : RUBY WOOD : RED SANDERS WOOD. Pterocarpus santalinus.

Undun Sundul-Ahmer ARAB.
Rachta chandana, BENG.
Honnay, CAN.
Ructchandoon CYNG.
Lalchundun. DUK.
Sandel-hout DAN.
Santale rouge, FR.
Sandal-holz, GER.
Ruckta-chundun,
Sundul i-surkh Buckum, PERS.
Rakta-Chandana:
Ranjana SANS.
Sigapoo Shandanum, TAM.
Kuchandanum TEL.
RuttunjeeGUZ.HIND
Saudalo roso, IT.

A heavy, insipid, and nearly inodorous wood, the product of a useful timber tree (*Pterocarpus santalinus*), found in Malabar, Mysore, Timor, and Ceylon. The wood is extremely hard, of a fine grain, and a bright garnet red colour, which brightens on exposure to the air It is employed to dye lasting reddish-brown colours; it communicates a deep red to alcohol, but gives no tinge to water.—*Faulkner.* Red saunders wood is principally shipped to England from Calcutta in logs from 2 to 10 inches diameter, generally without sap, and sometimes in roots and split pieces, it is very hard and heavy, it is very much used as a red dye wood, and often for turning. The logs are often notched at both ends, or cut with a hole as for a rope, and much worn externally from being dragged along the ground; other woods as also indeed Ivory tusks, are sometimes perforated for the like purpose.—*Tredgold* (Pterocarpus santalinus) a large tree, growing on the Pulicat and Tripaty mountains. The wood is usually seen in billets of 2 to 3 feet in length, of a deep red colour, the concentric circles being divided by dark lines. With different mordants, it yields various shades of red, these are said not to be permanent. This wood is largely exported from but little used in Madras. The Madras exports for 1854 amounted to 47,431 cwts. value 59,570 Rupees.—*M. E. J R.*

(7435) SAVARY KEERAY.

Savary keeray, TAM.

This green, says Ainslie, I have never seen, nor do I believe that the Botanical name of the plant has been ascertained. It grows in the southern parts of the peninsula and is eaten by the common people.—*Ainslies' Mat. Med. p.* 256.

(7436) SAVE, *Canarese.*

Samulu, TEL.

There are two sorts of this grain, viz. Hari Save and Hejjane. Poor people use them in food. It sells in Bangalore? seers for a Rupee. —*M. E. of* 1857.

(7437) SAVORY. Satureja hortensis, and montana. Aromatic herbs, now fallen into disuse, used to flavour soups, &c.

(7438) SAWS.

Scies, FR.
Sagen, GER.
Kurwuttee, GUZ. and HIND.
Seghe, IT.
Serras, PORT.
Pili, RUS.
Sierras. SP.

Are well-known instruments of various sizes, for cutting wood, iron, and other hard substances. They are manufactured on a large scale at Sheffield.—*Faulkner.*

(7439) SAXICOLA, a genus of Insessorial Dentirostral Birds belonging to the family *Sylviadæ*. Three British species belong to this genus as now constituted, the Stonechat, the Wheatear, and the Whinchat. This genus has the following characters:—Beak straight, slender, the base rather broader than high, surrounded with a few stiff hairs; the superior ridge of the upper mandible prominent, the sides towards the point compressed; the point itself curved and indented. Nostrils basal, lateral, oval, half closed by a membrane. Wings; the first quill-feather about half as long as the second; the second shorter than the third or fourth, which are the longest in the wing. Feet; the tarsus rather long, three toes in front, one behind; the outer toe connected by a membrane to the middle toe; claw of the hind toe short, strong, and curved. (Yarrell.)—*Eng. Cyc.*

(7440) SAXICOLA RUBICOLA, the Stonechat. This is the Traquet Rubicole and Moteux Traquet of the French; Saltabastone, Zompacardi, and Saltinpalo of the Italians; Schwarzkehliger Steinschmatzer of the Germans; Clochdery Cerrig of the Welsh; and Stonechatter, Stonesmith, Stonesmich, Stoneclink, and Moor-Titling of the English. It is found in Russia, Germany, France, Provence, Italy, Smyrna, Japan, the Deccan, the banks of the Ganges, the mountains of Upper Hindustan, Senegal, and South Africa (Cape), England, Ireland, and Scotland.—*English Cyclopedia, page* 687.

(7441) SAXIFRAGA. SAXIFRAGEÆ. These well known plants are mostly native of Britain with white, yellow, or pink flowers, the S. umbrosa, the London pride, is a pretty flower, the species are easily cultivated from seed in any garden soil.—*Riddell.*

(7442) SCABIOSA ELEGANS DIPSACEÆ. These plants with the sent of honey are well adapted for ornamenting the flower garden, they are propagated by seed, and grow readily in any good soil. the seed may be sown in pots at the close of the rains, and the plants removed when a few inches high. – *Riddell.*

(7443) SCAMMONY. CONVOLVULUS SCAMMONIA.

Sukmoonia, ARAB.	Sakmoonia, GUZ HIND.
Scammonee, FR.	Scammonea, IT.
Skammonien, GER.	Escamonea, SP.

A native of Syria and the Levant, recently discovered by Dr. Burn at Kaira in Guzerat. The proper juice of the plant when dried is called *Scammony.* The Scammony of Aleppo occurs in fragments, voluminous, dry, light, spongy, friable, pulverulent, with dull fracture of blackish grey, but covered with grey powder resulting from the reciprocal friction of the pieces, slightly transparent in small flakes, which become white and rather adherent when rubbed with a wet finger; odour disagreeable, taste weak, acrid, bitter, and repulsive, powder greyish white. The species of scammony is often adulterated with concrete juices of a similar kind, with flour, chalk, sand, and earth. According to the analysis of Bourtron La Grange and Vogel, good scammony consists of resin 60, gum 3, extract 2, and earthy and vegetable impurities 25 per 100. The most abundant harvest of scammony is in Smyrna and Aleppo. There are several modes of collection, which give rise to corresponding commercial varieties. The neck of the root being laid bare is divided ransversely, and shells placed around the edges o receive the juice as it exudes. This subsequently thickens in the air. The drug collected n this mode, is called shell scammony. This occurs in small porous masses, sometimes mooth, of reddish or whitish grey colour; of vaxy fracture, yellowish and half transparent, in hin layers, of disagreeable taste and smell; on lrying it becomes adhesive. Instead of shells he leaves of the chesnut tree are sometimes ised, and a flattened scammony of good quality ollected. If the roots be cut in successive layrs. the scammony is inferior, but still esteemed. t is dried either over a slow fire or before the un, and then moulded into stamped pastiles, of hitish colour. This variety is very rare in ommerce. Lastly, an extract is prepared from he expressed juice of the roots and stalks, this s moulded into round masses, of black, vitreous, nd resinous fracture. The Arab name of this rug, Ul Sugmoonia, signifies the *purgative.* everal old preparations called "diagredium" διακρηδιον.) are mixtures of scammony with ulphur and liquorice, and are now no longer sed.—*O' Shaughnessy, page* 500, 501.

(7444) SCARITIDÆ, a family of Coleopterus Insects belonging to the section *Geodephaga,* hich section corresponds to the genera *Carabus* nd *Cicindela* of Linnæus. The *Scaritidæ* have he prothorax separated from the elytra by a arrow cylindrical neck the mandibles are usully large, and armed with strong teeth on the inner side; the labrum is small; the mentum is furnished with a tooth: the antennæ are usually short, and have the basal joint long; the legs are short; the anterior tibiæ are broad, and strongly notched on the outer side, and fitted for burrowing; and the anterior tarsi in the males are not dilated. The body is usually elongated, and straight at the sides; head, thorax, and elytra, are nearly equal in width. The principal genera contained in this family are *Scarites, Pasimachus, Camptodontus, Acanthoceles, Clivina,* and *Dischirius.*

In *Scarites* (Fabricius) the mandibles are strongly toothed on the inner side, the second and third joints of the antennæ are obconic. and the following joints are shorter, compressed, and subquadrate. Dejean separates from *Scarites,* under the generic name *Oxygnathus,* the *S. elongatus* of Wiedemann, which differs in having the mandibles more slender and elongated, and destitute of teeth on the inner side. The only known species is found in the East Indies; it is of a very narrow form.—*Eng. Cyc.*

(7445) SCHIZANTHUS GRAHAMI, SCROPHULARINEÆ. This is a genus of pretty showy annuals, colours of the flowers are crimson, white and variegated, and should be grown, and treated as the Scabius.—*Riddell.*

(7446) SCHIZOPETALON WALKERI. CRUCIFERÆ. This is a singular plant with curiously cut petals, and a strong tapering root, and should be grown and potted like the Eschscholtzia.—*Riddell.*

(7447) SCHLEICHERA, a genus of Plants belonging to the natural order *Sapindaceæ* It has a 5-toothed calyx. Petals absent; the disc occupying the bottom of the calyx. The stamens 6-10, inserted between the margin of the disc and the ovary. The ovary is 3-celled, with one erect ovule in each cell. The stigma 3-cleft. The fruit is an indehiscent drupe, with 1, 2, or rarely 3 cells. The seeds are solitary in each cell, and covered with a pulpy arillus; the embryo much curved. The species are trees; the leaves abruptly pinnate, the leaflets nearly opposite. The flowers are small, disposed in spike-like racemes.—*Eng. Cyc.*

(7448) SCHLEICHERA. *Species,* in Tenasserim, the fruit of this tree resembles the wild rambootan in every thing except that it is covered with prickles half an inch long. It is rarely seen in market but would be a valuable addition to the dessert. The tree grows among the hills of Tavoy.—*Mason.*

(7449) SCHLEICHERA TRIJUGA. SAPINDACEÆ, Roxb. Fl. Ind. ii. p. 277.

Poovoo or poo marum, TAMUL.	Roatangha, TEL.

Grows in various parts of India. Has abruptly pinnate leaves from 8 to 16 inches long, the leaflets 2-4, opposite, sessile, broad, lanceolate or oblong-entire, rather smooth on both sides;

the lower pairs, the smallest, from 3 to 8 inches long. The petioles are a little downy, the stipules wanting. The racemes are axillary, or below the leaves round the base of the young shoots, solitary, in the male simple, in the hermaphrodite often compound, from 2 to 3 inches long. In the male flowers the calyx is cup-like, and 5-toothed. The corolla wanting, the filaments 6 10, erect, and many times longer than the calyx. The anthers oval and erect; the pistil a mere rudiment. The hermaphrodite flowers on a separate tree. The calyx, corolla, and stamens as in the male flower. The disc a fleshy yellow ring, surrounding the insertions of the filaments. The ovary superior, ovate, 3-celled, with one ascending ovule in each cell. The style short, stigma 3-cleft, recurved, slender, and downy The drupe about the size of a nutmeg, a little pointed, covered with a tender gray dry pericarp. The seeds are oblong, and surrounded with a whitish pulpy aril, which is of a pleasant acid taste, and most grateful during dry weather. It is a native of insular and continental India, where the astringent bark, mixed with oil, is used as a remedy for the itch. (Lindley, *Flora Medica*; Lindley, *Vegetable Kingdom*.)—*Eng. Cyc.* The wood is very hard. The pulpy sub acid oil is edible and palatable. (*Lindley.*)—*O'Sh page* 242. Wight says (No. 80) that it furnishes a red, strong, hard wood, generally rather small, used to make pestles, spokes for bandy wheels and such purposes, where much strength in small space is required.—*Wight.*

(7450) SCHMIEDELIA (in honour of Casimer Christopher Schmiedel, once a professor at Erlangen), a genus of Plants belonging to the natural order *Sapindaceæ.* It has a 4-parted unequal calyx, 4 petals, the 5th or superior one wanting. The disc incomplete, with 4 glands opposite the petals, 8 stamens inserted in the receptacle, and connate around the ovary at the base. The fruit is indehiscent, 1, 2, or rarely 3-lobed. The lobes roundish, fleshy, or dry, and 1-seeded. The seeds with or without an arillus. The species are trees or shrubs usually with trifoliate, rarely with simple existipulate leaves and racemose white flowers. The racemes are axillary.—*Eng. Cyc.* Wight gives Schmiedelia Cobbe, 964; Rheedii 964; and villosa, 401.

(7451) SCHMIEDELIA COCHINCHINENSIS has its leaves on long petioles, with serrated leaflets, terminal racemes, pilose small petals. The flower is small and white. It is a native of Cochin China on the banks of rivers. The leaves are used as cataplasms in contusions. (Don, *Dichlamydeous Plants*; Lindley, *Flora Medica*).—*Eng. Cyc.*

(7452) SCHMIEDELIA SERRATA. *Syn.* Ornitrophe serrata. Roxb. Fl. Ind. ii. p. 266. Bengal, Coromandel.

Rakhal phul, Hind. | Tanika, Tel.

Schmiedelia serrata has ternate leaves, the leaflets ovate, pointed, serrate, generally blistered, smooth on the back, and from 2 to 3 inches long. The racemes axillary, single, and erect. The flowers small, white, and polygamous. In the hermaphrodite flower, the calyx 4 leaved, and the petals 4, unilateral. The filaments very woolly near the base. The fruit is small, red, and succulent, and is eaten by the natives of Coromandel. The root is astringent, and is employed by the native practitioners in diarrhœa.—*Eng. Cyc.* The Ripe berries are eaten. Root astringent, and employed to check diarrhœa.—*O'Shaughnessy, p.* 242. Schmiedelia serrata, is only a straggling shrub, with very small timber, *Hort. Garden* 43.—*M. E. J. R.*

(7453) SCHORL. Schorl, or black tourmaline, is found in Madura, in great abundance, also in quartz near the mouth of Tavoy river on the east side, and also at the foot of the eastern mountains, near the head waters of the Dahgyaine, north east of Maulmain. These are the only localities in Tenasserim, where Mr. Mason met with this mineral. In both, the crystals are numerous, and in Tavoy they are large, but not so handsome as seen in foreign specimens.—*Mason.*

(7454) *Green Tourmaline.*—A green gem that cannot be distinguished by the eye from beryl, is brought with the Ceylon diamonds; it is however, green tourmaline; as may be ascertained by a very simple test, for beryl scratches quartz, but tourmaline is scratched by quartz.

(7455) *Ceylon Diamonds.*—White jewels of an inferior quality are often offered for sale in Maulmain under the name of Ceylon diamonds, but they are usually made from green tourmaline. White tourmaline, is a rare mineral, but the green variety being common, the jewelers by exposing it to heat expel its colour and it becomes white.—*Mason.*

(7456) SCHREBERA SWIETENOIDES. WEAVERS BEAM TREE.

Mamalinga maram, also | Makade Chettoo, Tel.
Mogalinga maram, Tam. |

A large timber tree, a native of vallies of th mountainous parts of the Rajahmundry Circars, Balaghat mountains &c. The wood i of a grey colour, very close grained, heavy an durable. It is reckoned less likely than other found thereabout to warp or bind, and i much used for weavers beams and for man other purposes. Dr. Roxburgh proposes its us for scales to mathematical intruments instead o box.—*Rohde M.S.S.*

(7457) SCILLA, OR SQUILLA, a genus o Plants belonging to the natural order *Liliace* It has 3 sepals coloured and spreading; petal very like them, and scarcely broader; stamens 6 shorter than the perianth, filaments smooth somewhat dilated at the base, acuminate, entir ovary 3 parted, glandular, and melliferous at th apex; style smooth, simple; stigma obscurely lobed, papillose ; capsule rounded 3-cornered 3-celled ; seeds numerous in two rows flattened with a membranous testa.—*Eng. Cyc.* Scilla is readily increased like others of the Lily tribe ; a light soil is most suitable.—*Riddell.*

(7458) SCILLA INDICA. Called *Iskeel*, by the native gardeners.—*O'Shaughnessy.* Scilla Indica is found on the sandy shores of various parts of India. It has a round white perennial bulb tunicated, about the size of a large apple ; leaves numerous, radical, sub bifarious, ensiform nearly flat, smooth on both sides from 6 to 18 inches long. When in blossom the plant is perfectly destitute of leaves, scape erect, round smooth, naked, including the raceme from 2 to 3 feet long ; raceme very long erect ; flowers remote ; long, pedicelled, drooping. This species is supposed by Dr. Roxburgh to possess the same qualities as S. maritima (Lindley, Flora Medica.)—*Eng. Cyc. p.* 699. This plant occurs on the sea-shores of the Indian Peninsula ; leaves numerous, radical, sub-bifarious, ensiform, nearly flat, smooth on both sides, six to eighteen inches long. When in blossom, the plant is entirely destitute of leaves : the bulbs are round, white, the size of an orange ; inodorous, nearly tasteless, and devoid of any medicinal properties but possibly this may have proceeded from their having been collected from an unfavourable locality, or at the improper season, as few plants are so much influenced by climate and circumstances as the squill, instances being known on the Spanish coast of its being quite nert in one locality, while as active as usual at the distance of but a few miles.—*O'Shaughnessy, page* 663.

(7459) SCINCIDÆ, SCINCOLDIANS, OR LEPIDOSAURS, the names given by Gray, Oppel, Fitzinger, and Messrs. Dumeril and Bibron to a family of Saurians.—*English Cycopædia, page* 699.

(7460) SCINDAPSUS, Of this genus, Wight gives, Scindapsus decursivus, 779 ; officinalis, 778 ; peepla, 780 ; pertusus, 781.

(7461) SCINDAPSUS OFFICINALIS. *Syn.* POTHOS OFFICINALIS ; Officinal Pothos : This creeper, as I judge, says Mason, is not uncommon on the forest trees, of Tenasserim, but I have never seen the plant in flower. This also enters into the native Materia Medica, but it is not used in European practice, although it has a place in Lindley's Flora Medica.—*Mason.*

(7462) SCITAMINACEÆ, a natural order of plants embracing the *Marantaceæ*, with 1 nther-valve, and the *Zingiberaceæ* with 2 anther-valves. The separation of these orders is now generally recognised. [MARANTACEÆ ; ZINGIBERACEÆ.]—*Eng. Cyc. Scitamineæ*, are abundant on the Khassia hills and extremely beautiful ; Dr. Hooker collected thirty seven kinds.—*Hooker Him. Jour. Vol.* II. *page* 281. The hat of the Lepcha in Sikkim is made of leaves of Scitamineæ, between two thin plates of Bamboo work. —*Hooker Vol.* I. *page* 131.

(7463) SCIURIDÆ, a family of Animals belonging to the order *Rodentia* [RODENTIA], and embracing the various forms of Squirrels It has the following characters :—Molar teeth simple, with tuberculous crowns ; five above, four below, on each side ; the lower incisors very much compressed. Toes long, armed with sharp claws, four on the anterior and five on the posterior feet : thumb very short. Tail long and tufted. Cheek-pouches in some. In others the skin of the sides extended between the anterior and posterior limbs. The geographic range of the Squirrels is very wide both in the Old and New World. None appear to have been discovered in Australia. The *Sciuridæ* have been divided into two principal groups :

A. Squirrels with free limbs.

Genera,—*Tamias*, *Sciurus*, *Macroxus* and *Anisonyx.*

B. Squirrels with their limbs invested in the skin of the sides.

Genera.—*Pteromys* and *Sciuropterus.*

(7464) *Tamias* (Ground Squirrels). The species are found in Europe, Asia, and North America.

Tamias Palmarum is the *Mustela Africana* of Clusius ; *Sciurus Palmarum* of Linnæus ; and Le Palmiste of Buffon.

(7465) *Sciurus* (True Squirrels). A slight depression of the frontal bones, and a very slight posterior projection of the same ; profile of the face very nearly straight ; cranial cavity as long as two thirds of the face. No cheek-pouches. Tail distichous.

The species are found in Europe, Asia, India and Indian Islands, Africa, North America, South America, and West Indian Islands.

(7466) SCIURUS BARBEI, *Blyth*, a small striped squirrel of Burmah.

(7467) SCIURUS BERDMOREI, *Blyth*, a small striped squirrel of Burmah.

(7468) SCIURUS BICOLOR, a gigantic squirrell abounds throughout the Burmese countries and Malayan Peninsula and northward to the Assam Hills and those of Sikkim, and Nepal, it is the Sc. Macrouroides of Hodgson. It has a pale variety in the Malayan Peninsula.

(7469) SCIURUS INSIGNIS, *Hors*, a small striped squirrel of the Malayan Peninsula.

(7470) SCIURUS KERANDRENII, is common in Arracan.

(7471) SCIURUS PHAYREI, *Blyth* : a Burmese squirrel.

(7472) SCIURUS PYGERYTHRUS, a Burmese squirrel : a supposed variety of Sc. Lokroides.

(7473) SCIURUS RAFFLESII, Vig and Hors. Sc. Prevostii, Desmarest, is a larger squirrel than

Sc. hippurus. It inhabits the Malayan peninsula. It is black above, deep rufo-ferruginous below and on the feet: a very broad white lateral band from mouth to haunch, extending over the outside of the thigh, and more or less greyish from cheek to shoulder: tail of a somewhat duller black than the back, and a little rufescent at tip.

(7474) SCIURUS REDIMITUS, Vander Boon. Sc. rufogularis Gray, a squirrel of Borneo.

(7475) SCIURUS RUFONIGER, Gray, probably a variety of Sc. redimitus.

(7476) *Sciurus maximus*, the Malabar Squirrel. Upper parts and external surface of the limbs bright chocolate-brown, which colour terminates abruptly, and is joined by the pale yellowish-brown on the under parts, fore-arms, and internal surface, of the limbs. Front of the fore-legs, neck, throat, face, and head between the ears, lighter in colour: a broad darker patch on the rest of the upper part of the head extends from the forehead to the middle of the nose. Back and shoulders sometimes deepening into black. Ears short, covered with long tufted hairs, and brush-like; from the longer part of each ear a narrow line of deep-brown passes downwards and backwards in an oblique direction. Whiskers scanty, long, and black. Claws incurved and strong, those of the anterior thumbs broad, short, and flattened. Tail distichous, the hairs expanding widely towards the extremity, bright chocolate-brown at the base. black in the middle, and chestnut in the extreme third part. Length about 33 inches, of which the tail measures rather more than one-half. It is a native of the Malabar coast.

Sonnerat appears to have been the first zoologist who observed this richly coloured species, the largest of the true Squirrels. It haunts among palm-trees, and is stated to be very fond of the milky juice of the cocoa-nut, as well as of the solid part of the nut. In captivity, it is tame and familiar; but it tries its teeth upon most substances that come within its power and should be guarded against accordingly.

(7477) *Macroxus*. Frontal bones very much depressed: nasal bones but little elongated; a deep depression between the cranium and the face. Tail round. No cheek-pouches. The species are natives of Sumatra, India, Africa, and South America.

(7478) *Pteromys*. Posterior part of the nasal bones a little convex; the frontal bones strongly depressed in their middle and rising slightly afterwards; the posterior parts of the head do not begin sensibly to curve downwards before the middle of the parietal bones; cerebral cavity small, only half the length of the head. The species are natives of Asia, the Moluccas, the Philippine Islands and Java.

(7479) *Sciuropterus*. Differing from *Pteromys* in having the anterior part of the profile line of the head straight to the middle of the frontal bones, where it takes a curved direction, very much arched, without any intermediate depression. Occiput projecting; frontal bones elongated; and the capacity of the cranium comprising three-fifths of the length of the head. The species are found in Northern Asia and North America.

(7480) *Sciuropterus Sagitta* (*Sciurus Sagitta*, Linn.; *Pteromys Sagitta*, Geoff.). This seems to be the *Sciurus maximus volans*, seu *Felis volans*, of Brisson; Le Taguan ou Grand Ecureuil Volant of Buffon. This squirrel has a small rounded head; cloven upper lip; small blunt ears; two warts at the utmost corner of each eye, with hairs growing out of them; neck short. Four toes on the fore feet; and instead of a thumb, a slender bone, 2½ inches long, lodged under the lateral membrane, serving to stretch it out; thence to the hind legs extends the membrane, which is broad, and a continuation of the skin of the sides and belly; the membrane extends along the fore legs, and stretches out near the joint in a winged form: five toes on the hind feet, and on all the toes sharp compressed bent claws. Tail covered with long hairs disposed horizontally. Colour of the head, body, and tail a bright bay, in some parts inclining to orange; breast and belly of yellowish-white. Length, from nose to tail, 18 inches; tail, 15 inches. (Pennant.) This species inhabits Java and others of the Indian Islands. It leaps from tree to tree as if it flew; and will catch hold of the boughs with its tail. It differs in size; that described by Linnæus was the size of our squirrel, whilst that killed by Sir Edward Michelbourne in one of the Indian islands was greater than a hare. Nieuhoff describes this species under the name of the Flying Cat, and says the back is black. He has given two very good figures of it—one in his frontispiece, the other in the page he describes it in. (Pennant.) In the description of Pennant, above given, there are two points which deserve consideration; that which describes the animal as catching hold of boughs with its tail, and that which states its difference in size. The first is given on the authority of Sir Edward Michelbourne's voyage, in Purchas's 'Pilgrims,' and should be received with caution. The second would lead to the conclusion that more than one species had been included under the name of the animal now under discussion. We accordingly find that Dr. Horsfield, in his valuable 'Zoological Researches in Java,' describes two Flying Squirrels (*Pteromys genibarbis* and *P. lepidus*) both nocturnal in their habits, nearly approaching to *S. Sagitta*. He describes the first as living on fruits; the second as found in the closest Javanese forests, where the height of the trees and the luxuriance of the foliage effectually conceal it. In the work last above referred to Dr. Horsfield has given a 'General Enumeration of Indian Sciuri,' well worthy of the attention o the Zoologist. He enumerates 16 species of *Sciuri*, 4 of which were first described by himself. These do not include the Flying Squirrels. —*Eng. Cyc.*

(7481) SCLERIA, A very long sedge, grows by the water in the river Soormah near Silhet and is used for thatching: boat-loads of it are collected for the Calcutta market, for which also were destined many immense rafts of bamboo 100 feet long.—*Hooker Him. Jour. Vol.* II. *page* 327.

(7482) SCOLOPACIDÆ, a family of Birds belonging to the order *Grallatores*. The genus *Scolopax* of Linnæus consisted of the following species: *Guarauna, Madagascariensis arquata, Phæopus, fusca, rusticola, Gallinago, Gallinula, Fedoa, Glottis, Calidris, Totanus, limosa, capensis, Lapponica, Ægocephala, alba*, and *candida*. ('Sys. Nat., ed. xii. According to Cuvier, this genus comprehends the following subgenera:—*Scolopax, Ibis, Numenius, Rhynchæa, Limosa, Calidris* (Cuv., *Tringa*, Temm.), *Arenaria*, (Bechst. *Calidris*, Vig.), *Pelidna, Falcinellus, Machetes, Eurynorhynchus, Phalaropus, Strepsilas Totanus, Lobipes*, and *Himantopus*. (Regne Animal, ed. 1829.)

Mr. G. R. Gray divides the *Scolopacidæ* into the following subfamilies and genera:—

I. *Numeninæ.—Numenius*, Ray; *Limosa*, Briss.; *Terekia*, Bonap.; *Erolia*, Vieill.; *Ibidorhyncha*, Vig.

II. *Totaninæ.—Totanus*, Ray; *Glottis*, Nils.; *Guinetta*, Briss.; *Actiturus*, Bonap.; *Catoptrophorus*, Bonap.

III. *Recurvirostrinæ.—Recurbirostra*, Linn.; *Cladorhynchus*, Gray; *Himantopus*, Briss.

IV. *Tringinæ.—Hemipalama*, Bonap.; *Heteropoda*, Bonap.; *Tringa*, Linn.; *Machetes*, Cuv.; *Pelidna*, Cuv.; (?) *Cocorli*, Cuv.; *Eurynorhynchus*, Nils.; *Ereunetes*, Ill.; *Calidris*, Ill.

V. *Scolopacinæ.—Macrorumphus*, Leach; *Rhynchæa*, Cuv.; *Scolopax*, Linn.; *Rusticola*, Vieill.; *Homoptilura*, Gray; *Telmatias*, Boie; *Gallinago*, Ray.

VI. *Strepsilinæ.—Strepsilas*, Ill.

VII. *Phalaropodinæ.—Steganopus*, Vieill.; *Phalaropus*, Briss.; *Lobipes*, Cuv. We now proceed to illustrate the principal Asiatic genera of this family:—

(7483) *Scolopax.*—Bill long, straight compressed, soft, the point enlarged; the two mandibles furrowed for half their length; point of the upper mandible longer than the lower, the enlarged end forming a blunt hook; arête elevated at the base, projecting. Nostrils lateral, basal, slit longitudinally near the borders of the mandible, and covered by a membrane. Feet moderate, slender, naked space above the knee very small; three toes before entirely divided, the external and middle toe united: a hind toe. Wings moderate, first quill rather shorter than, or of the same length as, the second, which is the longest. (Temminck.)

(7484) *Scolopax rusticola*, the Woodcock, is the Becasse of the French; Beccaccia of the Italians; Waldschnepfe of the Germans; Holt Sneppe of the Danes, Morkuna of the Swedes; Blom-Rokke, Rutte, and Krogquist, of the Norwegians; and Cyffylog of the Welsh. It is most probable the Σκολόπαξ of Aristotle. The male has the upper parts varied with ruddy, yellowish, and ash, and marked by great black spots; lower parts yellowish-red, with brown zigzags; quills striped with red and black on their external barbs; tail-feathers terminated above with gray and below with white; feet livid. Length about 13 inches. The female is rather stouter and larger, but her colours are less vivid, and the wing-coverts have many spots. The distribution of this bird is very wide. The species is found in Western Lapland beyond the arctic circle, in Finland, Russia, Siberia, rarely in Germany, and more rarely in France. A few have been known to breed in Switzerland. It is very common in Italy and at Maderia, Barbary, Athens, 'Smyrna, Aleppo, Egypt, Cashmere, and Japan, are other localities. It feeds on worms, snails or slugs, and (according to Temminck) small beetles; but earthworms appear to be its favourite nourishment. For these, it bores with its long and sensitive bill with unerring certainty. The Woodcock breeds occasionally, not to say frequently, in great Britain, in Scotland especially. The nest is placed on the ground in a dry warm spot among herbage, and is loosely fabricated of dead leaves, of the common fern principally, and unlined. The eggs, three or four in number, are pale yellowish-white, blotched, and spotted at the larger end with ash-gray, and two shades of reddish-yellow brown, according to Yarrell; of a dirty yellow sprinkled with small spots of pale brown, according to Temminck. When surprised, the old birds have been known to carry off their young in their bills and claws.—*Eng. Cyc.* They are found on the Neilgherries, and in 1842, one wae shot at Kuladghee. We need hardly add that the bird, served with its trail in, is a delicious dish. The Snipes belong to this section. Those most familiar to the English sportsman and ornithologist are the common Snipe, the Jack Snipe, and the Solitary Snipe: Sabine's Snipe (*S. Sabini*) is of very rare occurrence, and indeed the Solitary Snipe is far from common.

(7485) *Scolopax Gallinago*, Linn., *Gallinago, scolopacinus*, Bonap., the Common Snipe. It is the Beccaccino and Pizzarda of the Italians; Becassine, or Becasseau, and Chevre Volant, of the French; Heer Schnepfe and Himels Ziege of the Dutch; Watersnep of the Netherlanders; Myr Snippe of the Icelanders; Horsgjok of the Swedes; Hossegioeg of the Danes; and Ysnittan y Fyniar of the Welsh. The normal number of tail-feathers is 14, varying to 16 (Brehm's Snipe) and 12 (Delamotte's Snipe). Upper parts variegated very nearly as in the Solitary Snipe; neck and breast striped longitudinally; sides striped transversely with white and blackish; middle of the belly and abdomen spotless, pure white; base of the bill ash-colour; the rest brown; feet pale-greenish; length about 10½ inches, of which the bill measures about 2¾ inches. The colours of the plumage, after the spring moult, are brighter and more brilliant with bronze reflections than after the autumnal moult: in winter the hue becomes more ashy.

Varieties.—Pure white; reddish-white; the feathers sprinkled or blotched with white, or some part of the plumage white.

Mr. Gould ('Birds of Europe') states that, although the contrary has been long stated by naturalists, he conceives that the natural range of the Common Snipe is comparatively limited; and that the Snipes from India, Africa, and North America, which have been regarded as identical with our bird, will be found, on examination, to be specifically distinct.

The following localities have been given as the range of the Common Snipe in Europe and Asia:—Russia and Siberia, from Scona to Lapland, Norway, Sweden, Denmark, Faroe Islands, Iceland and Greenland, Germany, Holland, British Islands, France, Spain, Provence, Switzerland, Italy, Hungary, and Illyria.

Marshes, moist meadows, and, in frosty weather, the edges of rushy rills, are the haunts of the snipe. In such situations they have been seen pushing their bills by means of repeated thrusts, quite up to the base in the mud, drawing them back with great quickness, and shifting their ground every now and then. Their food consists of such worms, insects, and small molluscs as haunt such miry places, and they have been shot in the act of feeding on leeches.

Few birds are better eating than a fresh Snipe. The old quatrain says:—

" Le becasseau est de fort bon manger,
Duquel la chair resueille l'appetit.
Il est oyseau passager et petit.
Et par son goust fait des vins been juger.,

Snypes were among the birds admitted to the Earl of Northumberland's table ('Household,' 1512), and were then charged at threepence a dozen.

(7486) *Scolopax major* (*Gallinago major*, Bonap.), the Solitary, Double, or Great Snipe, is the Grand or Double Becassine of the French; Beccacino Maggiore, Pizzordone, and Croccolone, of the Italians, Mittelschnepfe and Doppelschnepfe of the Germans; Poelsnep of the Netherlanders; Great Snipe, Double Snipe, and Solitary Snipe, of the English; and Ysnid of the Welsh. The tail is composed of 16 feathers; midrib of the first quill whitish: the black of the top of the head divided by a band of yellowish-white; eyebrows of that colour; upper parts variegated with black and bright rusty, the last-named colour disposed longitudinally; lower parts whitish-rusty; belly and sides striped with black bands; bill inclining to reddish, brown at the point; feet greenish-ash.—(*Temm.*)

(7487) *Numenius.* Bill long, slender, curved, compressed, hard at the point, and subobtuse; upper mandible exceeding the lower, rounded towards the end, canaliculated for three-fourths of its length; nostrils lateral, linear, pierced in the canaliculation; face feathered, space between the eye and the bill covered with feathers. Feet slender, naked above the knee; three toes before and one behind, which last is articulated on the tarsus and touches the ground, the anterior toes united up to the first joint by a membrane. Wings moderate; first quill longest.

(7488) *Numenius arquatus*, the Curlew. It is the Courlis of the French; Ciarlotto Spadone, and Chiurle Maggiore of the Italians; Heel-Spove of the Danes; Der Groose Krumschnoblichte Schnepfe and Kelihacke of the Germans; and Gylfinhir of the Welsh. It is equally diffused from the sultry portion of the torrid zone to the frozen countries of the north: the islands of the Pacific Ocean, particularly Australia, are not devoid of its presence, and we also possess examples from China, Nepaul, &c. (Gould, 'Birds of Europe.') Dr. Andrew Smith brought individuals from South Africa.

(7489) *Numenius phæopus*, Auct., *Scolopax phæopus*, Linn.; genus *Phæopus*, Cuv. This is Le PetitCourlis, or Courlieu, of the French; Chiurlo Piccolo, Chiurlo Minore, and Mengotto, of the Italians; Regen Brachvogel, Kleine Art Brachvogel, Regen vogel and Kleiner Gossier, of the Germans; De Kleine of Regenwulp, of the Netherlanders; Mellum-Spove of the Danes; Smaae Spue of the Norwegians; Whimbrel, Curlew-Knot, Curlew Jack, Jack-Curlew, Half-Curlew, Titterel, Chikerel, and Tang-Whaup of the English; and Goeg Ylfinhir of the Welsh. All the plumage bright ash-colour; longitudinal brown spots on the neck and breast; on the middle of the head a longitudinal band of yellowish-white, with another twice as wide and brown on each side; belly and abdomen white; feathers of the back and scapulars very deep-brown in the middle, and bordered with brighter brown; tail ashy-brown, streaked with brown bands disposed obliquely; bill blackish, but reddish at its base; iris brown; feet lead colour. Length of male 16 inches, bill 3 inches; of female 18 inches, bill 3½ inches.

It is very widely distributed. Denmark, Sweden, Norway, Lapland, Faroe Islands, Iceland, Germany, Holland, France (but more common in Holland than in France or Germany), Italy, Spain, Provence, Madeira, and the central part of North Africa. Asia—Caucasus, Himalaya Mountains, Bengal, and Japan.

(7490) *Limosa.*—Bill very long, more or less curved upwards, soft and flexible throughout its length, depressed, and flattened towards the point ; the two mandibles furrowed throughout their length, the point flat, dilated, and obtuse.

(7491) *Limosa melanura*, the Godwit. Bill straight ; tail uniform black, with a base of pure white ; claw of the middle toe long and dentilated ; a white beauty-spot (miroir) on the wings.

Mr. Gould says that this bird inhabits the whole of the European continent, and that examples are found in most collections from Africa and India. With us they are most frequently seen in spring and autumn. They breed mostly n high northern latitudes, but occasionally in England. In Ireland the species is but seldom seen. The food consists of insects and their arvæ, worms, &c. The nest is formed of dry grass and herbage, and the four eggs are light olive-brown, blotched and spotted with darker brown.

(7492) *Tantalus*, Linnæus.—This genus stands between the genera *Ardea* and *Scolopax*, in the welfth edition of the ' Systema Nature.'

Cuvier places the genus *Tantalus* between the Open-Beaks (*Hians*, Lacep.' *Anastomus*, Ill.) nd the Spoonbills (*Platalea*, Linn.). He characerises the genus as having the feet, the nostrils, nd the bill of a stork : but the back of the bill s, he observes, rounded, and its point curved ownwards and slightly notched on each side ; portion of the head, and sometimes of the neck s, he adds, denuded of feathers. He notices the following species :—The American Tantalus, T. *loculator*, Linn. ; the African Tantalus, *T. Ibis* Linn. ; and the Ceylonese Ibis, *T. leucocephalus*, he largest of all.

(7493) *Tantalus religiosa*, the sacred Ibis. Abou-Hannes, Bruce ; *Tantalus Æthiopieus* of Latham ; L'Ibis Sacre, Cuv.

“ This,” says Cuvier, “ is the most celebratd species ; it was reared in the temples of anient Egypt with veneration, which approached o worship ; and it was embalmed after its death, s some said, because it devoured the serpents hich would otherwise have become dangerous o the country ; according to others, because there as a resemblance between its plumage and some f the phases of the moon ; finally, according o some, because its advent announced the sing of the Nile. For a long time it was hought that this Ibis of the Egyptians was the *Tantalus* of Africa : we now know that it beongs to the genus of which we are treating. It as large as a hen, with white plumage, except he end of the wing-feathers, which is black ; the ast coverts have their barbs elongated, loose, lack, with violet reflections, and thus covering he end of the wings and tail. The bill and the eet are black, as well as all the naked part of the ead and neck : this part is covered in youth, at east on its upper surface, with small blackish feathers. The species is found throughout the extent of Africa.” [ABOU-HANNES.]

The other species noticed by Cuvier are—L'Ibis Rouge (*Scolopax ruber*, Linn. ; *Tantalus ruber*, Gm.) and L'Ibis Vert, vulg. Courlis Vert (*Sclolopax falcinellus*, Linn). (' Regne Animal.') —*Eng. Cyc.*

(7494) SCOLOPENDRIUM : FILICES ; FERNS. Mr. Royle informs us that many of these are still used in medicine in India. The rhizomes, or dried leaves of *Scolopendrium*, are sold under the altered name, *Iskoolikundrioon*. *Those* of Polypodium are called *bulookunboon*. The Asplenium radiatum, *mohrpunkhee*, or peacock's fan, is employed by the natives probably as an anthelmintic.—*O'Shaughnessy.*

(7495) SCOMBRIDÆ, a family of Fishes of the section *Acanthopterygii*, of which the Common Mackerel may be regarded as a type : the Tunny, Sword-Fish, Dory, and Boar-Fish, also belong to this group, which contains a multitude of species and many genera. The body is generally covered with small scales ; the tail is usually very powerful and deeply cleft : in most of the species the pectoral fins are long, narrow, and pointed ; the dorsal fins are two in number, the foremost of them being composed of bony rays ; the hinder dorsal is chiefly supported by soft rays, and is often divided into numerous small false fins. They are provided with numerous cæca, and these are often united in clusters.

(2496) *Xiphias* has the upper jaw elongated, forming a sword.

(7497) *Xiphias gladius*, Linnæus, the Sword-Fish, is an inhabitant of the Mediterranean and Atlantic, occasionally visiting the British coast. It measures from 10 to 15 feet in length. Its body is lengthy and covered with minute scales, the sword forming three-tenths of its length. On its back it bears a single long elevated dorsal fin ; there are no central fins. The tail is keeled. The lower jaw is sharp ; the mouth without teeth. The upper part of the fish is bluish-black merging into silver below. The Sword-Fish is said to attack the whale, wounding it with its beak. There are many well-authenticated instances of the planks of ships being perforated by the upper jaw of this powerful creature, which, it has been supposed, occasionally attacks the hulls of ships in mistake for the whale. Specimens of ships' timber penetrated by its sword are preserved in many museums. The *Xiphias* is mentioned by Aristotle (' Hist Anim,' viii. 19), who notices the fact of its striking vessels. The young fish is said to be good eating. When very young the body is covered with small tubercles, which disappear before it attains the length of three feet. —*Eng. Cyc.*

(7498) SCOPOLIA ACULEATA, SMITH.

Molakarunuay, TAM.

This is a small white root, about the third part of an inch in diameter, the bark of which is bitter and subaromatic and is considered as stomachic and tonic. It is given in a weak infusion to the quantity of half a tea cup full in the course of the day.—*Ains. Mat. Med. p.* 89.

(7499) SCORPIONIDÆ, a family of the class *Arachnida* order *Pulmonaria*, and section *Pedipalpi*. The animals of this family, commonly called Scorpions, are distinguished from other groups of spiders by their having the abdomen articulated and terminated by a curved spur at the extremity; the palpi are very large, and the terminal segment assumes the form of the lobster's claw, being in like manner provided with pincers; the stigmata are eight in number, and situated along the inferior and lateral part of the abdomen; on the under side of the thorax are two comb-like appendages. The number of the eyes varies from eight to twelve in different species, and some sub-genera have been established upon this character. Those to which the term *Scorpio* is used in its most restricted sense have only six eyes; those Scorpions which have eight eyes constitute the subgenus *Bathus;* and those which have twelve eyes, *Androctonus.* "These Arachnides," says Latreille, "inhabit the hot countries of both hemispheres, live on the ground, conceal themselves under stones and other bodies, most commonly in ruins, dark and cool places, and even in houses. They run with considerable swiftness, curving the tail over the back—this they can turn in every direction, and use for the purposes of attack and defence. With their forceps they seize various insects, on which they feed after having pierced them with their sting. They are particularly fond of the eggs of spiders and insects. The wound occasioned by the species found in the southern parts of Europe (*Scorpio Europæus*), is not usually dangerous; but according to the experiments of Dr. Maccary, made upon himself, the sting of some other and larger species produces serious and alarming symptoms, and the older the animal the more active seems to be the poison. The remedies employed are the volatile alkali, and chloroform used externally and internally, and externally ipecacuan in form of a paste. The young Scorpions are produced at various intervals, and are carried by the parent for several days upon her back, during which time she never leaves her retreat. The pain suffered from the scorpion's sting seems to depend more upon the temperament of the sufferer than any other cause; some suffering much agony, occasionally terminating in death, while others become only slightly agitated.—*Eng. Cyc.*

(7500) SCORZONERA AND SALSAFY. This is a long milky-juiced root. Grows without any difficulty after the rains. It is an annual from the South of Europe. It should be sown either in beds, broad-cast, or planted out in rows at a distance of a foot apart. The root when boiled and dressed is rather a delicate vegetable. It comes to perfection in three or four months. Salsafy—is the black Scorzonera, and requires the same treatment.—*Jaffrey.*

(7501) SCREW PINE OR VACOA. PANDANUS ODORATISSIMUS.

Keora or Kaldera bush.
Thaium, Thaulay Mazalie.
Seethay Nar and Umbrella Tree.

It grows along the Coasts of the Peninsula of India, and its leaves are extensively manufactured into mats, baskets and hats, at Pulicat, and other localities. The fibre of the leaf is white, soft, glossy, but possessed of little strength, and though but ill suited for cordage, it has been found well adapted for the preparation of a good quality of paper, also for mats, and sacks. It appears to be the same as the P. Sativus of Du Petit Thouars, and the P. Vacoa of Mr. Henley which is described as growing to the height of 30 feet and good sacking is made from its leaves. Its fibrous aerial roots are much employed as paint-brushes. The leaves are cut every second year, beginning when the plant is two years old. Immediately on its removal from the trees, they must be split into fillets, three to four feet long from three fourths to one inch broad at the base, tapering into a point. The Pandanaceæ or Screw-pines abound in the Mauritius or Bourbon but are found also in India, the Straits and Burmah.—*Royle &c.* The number of names by which plants are known in different districts of India is very confusing. The screw pine is a good instance of this. At the Madras Exhibition of 1855, the only clean specimens of this fibre were exhibited by Mr. Underwood, and the Madras School of Industrial Arts. All the others were discolored by rotting. The leaves of the plant are used by the natives for making mats—baskets and hats. There are extensive manufactories of these articles at Pulicat, Cuddalore and several other localities. The fibre of the leaf is white, soft, and pulpy, but possessed of little strength. It appears to be a good material for the preparation of paper, but ill suited for cordage. The aerial roots are much used as coarse brushes for white washing houses, when beaten with a mallet, they open out like a soft brush.—*M. E. J. R.*

(7502) SCROPHULARIACEÆ, *Figworts,* a natural order of Plants belonging to the dicarpous group of Monopetalous Exogens.

The *Scrophulariaceæ* are very widely diffused over the surface of the earth, being found in the whole range of climate between the poles and tropics. Achimenes Cochin-chinensis when pickled, is much esteemed, in the country where it grows, as an article of diet.—*Eng. Cyc.*

(7503) SCYLLARIDÆ, OR SCYLLARIANS, a tribe of Macrurous Decapods, established by M. Milne-Edwards on the genus *Scyllarus* of Fabricius, and forming one of the most remarkable groups, distinguished at the first glance by the singular conformation of the external antennæ. The antennæ are inserted on the same line below the eyes ; the first pair slender, and present nothing remarkable ; their first joint is nearly cylindrical and much stouter than the two following ones ; finally, they terminate by two very short multi-articulate filaments. The external antennæ are foliaceous and extremely wide ; the piece which carries the auditory tubercle is confounded with the epistome, and followed by four joints, the second and fourth of which are lamellar and extremely large. The buccal frame is small, and the jaw-feet are moderate and nearly pediform. M. Milne Edwards divides the tribe into three genera *Siyllarus*, *Thenus*, and *Ibacus*.

(7504) *Thenus* (*Scyllarus*, Fabr. ; *Thenus* (?), Leach). Body very much depressed, and much narrowed from before backwards. Ocular peduncles very long. Eyes going beyond the carapace aterally ; the orbits, directed outwards, occupy the external angle. Sternum much wider than n *Scyllarus*. Abdomen with nearly the same proportional length as in those crustaceans.

(7505) *Thenus orientalis*. Length about eight nches.—*Eng. Cyc.*

(7506) SCYPHANTHUS. LOASACEÆ.—These are pretty little yellow flowers, and require the same treatment as the Loasa.—*Riddell.*

(7507) SCUTELLARIA. LABIATÆ.—These plants are handsome when in flower, and are dapted for the front of borders, the colours are purple, yellow, red or blue, the flowers resembling the Antirrhinum, and may be grown from eed in any good garden soil.—*Riddell.* Wight gives Scutellaria rivularis, 1450, and violacea, 449.

(7508) SEA COCOANUT OF SEYCHELLES : LODOICEA.

ee-Calappers, CYNG.
Cocotier de Maldives, FR.
Durya-ka-Nareel, DUK. GUZ. HIND.
Kuddil Tayngai, TAM.
Samatrapoo tainkaya, TEL.
Ubdic Narikaylum, SANS.

This species of cocoanut is convex on one side, nd almost flat on the other, oblong, and somehat pointed at both ends. The shell is dark coloured, and contains a kernel, not unlike that f the ordinary cocoanut, but drier, harder, and more insipid. They are often seen floating in he sea off the coasts of Arabia and Africa, whence hey are brought to Bombay ; and also from he Laccadive and Maldive Islands. The shells re made into drinking cups, which are used by he Indian devotees. The kernel is used medicinlly by native practitioners, in cases of typhus ever, &c.—*Faulkner.* See COCOANUT, DOUBLE ; lso LODOICEA.

(7509) SEA-COCOANUT OF TENASSERIM : XYLOCARPUS GRANATUM. This is not he famous *Cocos des mer* of the Seychelles, so long the wonder of the world ; but a tree very common in the mangrove swamps ; and growing near the shore, its fruit falls into the water and floats out upon the sea, which gives rise to its name. The fruit is not edible, but is exceedingly astringent, and regarded by the natives as a specific in cholera.—*Mason.*

(7510) SEAFORTHIA, a genus of plants belonging to the natural order *Palmaceæ*, indigenous to the eastern coast of tropical Australia, and found also in the nearest Asiatic islands, named by Mr. Brown in honour of Francis, lord Seaforth, a patron of botany. The species are elegant in appearance, with pinnate fronds, the genus is described by Labillardiere under the name of *Ptychosparma.*—*Eng. Cyc.*

(7511) SEAHORSE TEETH, are imported into China, chiefly through Macao ; they are brought from California and other parts of western America, and are used by the Chinese in the same manner as ivory ; they are the teeth and tusks of the walrus, and other cetaceous animals.—*Morrison.* See IVORY.

(7512) SEA KALE. CRAMBE MARITIMA. Cultivation at Madras unknown and it is a vegetable not worth experimenting upon —*Jaffrey.*

(7513) SEA SHELLS, *insects*, &c. The shores of the islands of the Indian ocean afford a great variety of beautiful and rare shells, the ducal mantle, &c. They are brought hither in junks from the Archipelago, and from the islands along the coast. The assortment of shells for sale here is not so great as might be inferred from the quantities exposed, but by a little search and selection, one can collect many tons, mostly salt water shells. Few or no fresh water shells are collected. Both sorts are sometimes injured by scraping and varnishing them.—Beside shells, as objects of natural history, insects are also procurable at Canton, tolerably well preserved : they are mostly coleopterous insects, as beetles ; butterflies and other classes are also gathered, especially those which are gay. Precious stones are seen in small quantities, but rather inferior ; chrysolite, malachite, cornelians, agates and jade, are the most common : other minerals, especially limestone and quartz, are cut into fantastic shapes ; but these specimens being always lackered, are spoiled for natural objects. Birds or fishes are seldom seen preserved.—*Morrison.*

(7514) SEAL. The name of a family of amphibious animals, valued for the oil obtained from the fat or blubber, and also for its skin, which is used for a variety of purposes.—*Faulkner.*

(7515) SEALING WAX.

Cire d Espagne, FR.
Cire a Cacheter, GER.
Seigellack, GUZ.
Chap-ka Momom, HIND.
Cera Lacca, Cera di Spagna, IT.
Surgutsch, RUS.
Lacre. SP.

Is a composition of gum lac, melted and incorporated with resin, and afterwards coloured with some such pigment as vermilion, ivory-black &c. It is used for sealing letters, legal instruments, &c.—*Faulkner*. *Sealing-wax* is also made from lac, and several varieties have been sent from different parts of India. Garcias ab Orto described it as made from lac in the year 1563. Tavernier mentions the same fact. The Spaniards have obtained credit for the invention; but they, no doubt, learned it from the Arabs. A Frenchman who travelled much in Persia and different parts of the East Indies is also thought to have been the discoverer; and by Beckmann it is considered to be a German invention. This is hardly a chemical art, but it is probably better placed here than elsewhere.—*Royle, Arts &c. of India, page* 486. The Sealing wax made at Guntoor is very good, and, for a hot climate, better than the English wax, as it does not soften with the heat of the atmosphere.—*M. C. C.*

(7516) SEALS.

Cachets, Fr.
Moohur, Guz. Hind.
Sigillum, Lat.
Sellos, Port. Sp.
Petchafte, Ger.
Sigilli, It.
Mohur, Pers.

Are stamps for impressing letter-wax, and other soft substances. They are usually formed of stone or metal, on which some device, &c. is engraved.—*Faulkner*.

(7517) SEASONS AT MADRAS.

Horticultural Division of the Seasons in Madras, &c.

Madras.		England.
Spring.		*Spring.*
August.		February.
September.	Sow seeds, plant trees and shrubs.	March.
October.		April.
Summer.		*Summer.*
November.		May.
December.	Vegetables should be plentiful.	June.
January.		July.
Autumn.		*Autumn.*
February.		August.
March.		September.
April.		October.
Winter.		*Winter.*
May.		November.
June.	Protect tender plants from the hot winds.	December.
July.		January.

Jaffrey.

(7518) SEBESTENS, Lindley's name for the order *Cordiaceæ*.—*Eng. Cyc.*

(7519) SEBESTENS. Cordia Myxa.

Lesura, Hind.; Buhooari, Beng.

Sebestena, fruit and pulp of Cordia Myxa.—*Ben. Ph.* 294. These were formerly used in Europe but now by the native practitioners of the East only. The dried fruits are very glutinous, and are esteemed expectorant. The seeds of Cordia Myxa, are called Chakoon kee beenge, and deemed an infallible remedy in ringworm, the powder mixed with oil being applied to the eruption (Beng.—Dis.)—*Thirty five years in the East by Dr. Honig. p.* 343.

(7520) SECALE, a genus of Grasses, to which the cultivated Rye belongs. The flowers are arranged on a spike; the spikelets are 2-flowered, with a long stalked rudiment of a third floret, the glumes are subulate. In other respects this genus strongly resembles *Triticum*, to which the Common Wheat and Couch-Grass belong.—*Eng. Cyc.*

(7521) SECALE CEREALE, Rye, has the glumes 1-nerved and shorter than the spikelet; the rachis is very tough. This plant is extensively cultivated in Europe, and nowhere has been observed in a truly wild state, away from the possibility of escape from cultivation, being sown by the agency of man.—*Eng Cyc.*

(7522) SECAMONE, a genus of Plants belonging to the natural order *Asclepiadaceæ*, found in the warm parts of India, Africa, Australia, and in the West Indies. The name is probably derived from the Arabic Sukmoonya, as this is the proper name in Prosper Alpinus of the *Secamone Alpinii*, or *Periploca Secamone* of Linnæus. The genus *Secamone* is characterised by having a quinquifed calyx and corolla, the latter being rotate; stamineous crown 5-leaved, with the leaflets compressed laterally; pollen masses 20, erect; stigma coarctate at top; follicles smooth; seeds numerous, hairy at the umbilicus. The species form erect or climbing smooth shrubs with opposite leaves; the flowers are small, and the inflorescence in cymes, which are dichotomous, arising from between the petioles. Some of the species of *Secamone* secrete a considerable quantity of an acrid principle, which makes them useful as medicines. Thus the roots of S. *emetica*, being emetic in action, are employed as a substitute for Ipecacuanha; whilst the substance called Smyrna Scammony is said to be obtained from the Egyptian species, S. *Alpinii* of Rœmer and Schultes, the S. *Ægyptiaca* of Brown.—*Eng. Cyc.*

(7523) SECAMONE EMETICA. *Syn.* Periploca Emetica, Retz.

Grows common in the southern parts of the peninsula of India at the foot of mountains; a smooth twining shrub, leaves short stalked, veinless, smooth, varying from elliptical to narrow lanceolate, cymes interaxillary, shorter than the leaves. Roots acrid and emetic.—*O'Shaughnessy, page* 461.

(7524) SEDGES. Cyperaceæ. The *Cyperaceæ* may be called the Grasses of moist situations, and very closely resemble them in appearance; but they may readily be distinguished by their stems being solid often triangular, and their leaves with entire, not split sheaths. Though a few do secrete fecula in their tuberous rootstocks, as the Water Chesnut of the Chinese, &c., others secrete a little Volatile Oil, as *Cyperus* *longus* and *rotundus*. They are mentioned here beause the creeping rhizomes of *Carex arenaria*, and of a few allied species, are sometimes used medicinally, under the name of German Sarsaparilla.—*Royle*. Sedges nearly resemble grasses in appearance, but grow usually in moist situations, and are distinguished from them by their angular stems. There are few of them useful for any purpose—not even for fodder. One of them, however, is famous as having yielded the Papyrus of the Egyptians, employed by them for making paper, ropes, and even boats; and of which the plant is so frequently represented in their Sculpure and paintings. An Indian species of Cyperus (*C. tegetum*, Roxb.; *called Papyrus Pangorei* by Nees von Esenbeck), the *Madoorkati* of the Bengalees, which is extremely common about Calcutta and in Bengal, is very extensively employed for making the elegant, shining and useul mats for which the capital of India is famous, nd which are frequently imported into Europe. Dr. Roxburgh states that the culms or stalks of he plant when green are split into three or four ieces, which in drying, contract so much as to ring the margins in contact, in which state they re woven into mats, and thus show a nearly imilar surface on both sides. Specimens of the trips of this sedge were sent to the Exhibition t 1851, as well as mats made of them. These rips are tied up in bundles about four inches n diameter and four feet in length; and seem, esides their extensive use for mat-making to be ell adapted for platting. The cotton-grass (*Eriophorum*) of Europe is a conspicuous ornaent of turf-bogs and marshy moors, from havng its seeds clothed at the base with a silky or otton-like substance. With this, pillows are ometimes stuffed, and wicks of candles as well s paper, made. There is a species of the genus ery common in the Himalayas, both in low alleys and at considerable elevations. This, r. Royle named *Eriophorum cannabinum*, in consequence of his finding it everywhere employed in aking ropes for all ordinary purposes by the ountaineers. Its name, *bhabhur* and *bhabhuree*, as a considerable resemblance to that of the apyrus, considering that the *b* and *p* are letters frequently interchanged for each other. All ho have scrambled up the steeps of the Himayas will remember the great support they have eceived from the toughness of the tufts of the habhur. Specimens of the dried leaves, made into bundles about three feet in length, were nt to the Exhibition of 1851, from Beerbhoom. lso twine made from it: this, though rough, strong and well fitted for ordinary purposes. apt. Huddleston, in a paper on the Hemp nd other fibres of Gurhwal, in the Himalayas 'Trans. Agric. Soc. of India,' viii, p. 272), entions the Bhabhur as holding a conspicuous lace, "from its extensive use and most abundant supply throughout the whole of the hills, affording a most economical substitute as an article of cordage, in lieu of others of a more costly and durable nature. All the jhoolas or rope bridges, which are erected over the large rivers where sanghas or wooden planked bridges cannot be made, on all the principal thoroughfares of that district, are constructed of this silky species of grass, the cables of which are of a considerable thickness. These rope bridges are a very safe means of communication over the large and rapid rivers intersecting different parts of the country, both for travellers and men with loads; and, where the footway and sides are properly laced with brushwood, afford an easy enough roadway for loaded sheep—but neither ponies nor cattle can travel over them. This grass grows abundantly in all the ravines of the sides of the mountains, and is to be had only for the cutting—but it is not of a very durable nature, though pretty strong when fresh made into ropes. It lasts about a twelvemonth only, or a little more, and the people in charge of the rope bridges are constantly employed in repairing and annually renewing the ropes and stays. The 'chinkas,' or temporary bridges of a single cable, upon which traverses a seat in the shape of an ox-yoke, are also sometimes made of this grass."—*Royle Ind. Fib. p.* 35.

(7525) The *papyrus* of the Egyptians belongs to this genus, and is still called *babier* in Syria. It is about 15 feet high; the exterior tunic of the stems cut in bands, and pressed, formed the paper of ancient Egypt and Europe; the leaves, which are several feet long, served for the same purpose, but were of inferior quality. This paper is but little liable to decay. Pliny, for instance, relates that the book of the laws of Numa Pompilius was found in Rome in a high state of preservation, after having been buried nearly six centuries in the earth.—*O'Shaughnessy, page.* 628.

(7526) SEDUM CÆRULEUM: CRASSULACEÆ. A species of succulent plants, with various coloured flowers, all of which should be grown separately in pots, in a light sandy soil mixed with brick rubbish, they are propagated by seed, these plants are well adapted for rock work.—*Riddell.*

(7527) SEED.

Beenge, Guz. Hind.	Vittooloo, Tel.
Tukhm, Pers.	

In commerce, the grains of several species of gramina. Those of most importance, in a commercial point of view, are clover seed, flax or linseed, rape seed, mustard seed, hemp seed, and jingelly or sesamum seed.—*Faulkner*. In China, in the packing of seeds, they first gather the seeds from the plants, then put each kind, separately, into a small bottle, and then pack the whole with a little box, ready for being shipped to Europe or America.—*Fortune, page* 131.

(7528) SEKAKOY.

Sekakoy, Guz. Guz. Hind. Tam. Tel.

The name given in India to a long, flat pod, or legume, containing separate, small, oval, dark coloured seeds, considered by native practitioners a most valuable medicine. In taste it somewhat resembles the soap-nut, but is more acrid, less bitter, and has a singular pungency. It is extensively used in India for washing the head.—*Faulkner.*

(7529) SEMAL KA PHOOL. Flowers of the Bombax heptaphyllum, considered refrigerant. —*Genl. Med. Top. p.* 152.

(7530) SEMECARPUS, a very small and entirely Indian genus of Plants belonging to the natural order *Terebinthaceæ*, of which the name is derived from σημεῖον, a mark, and καρπός, fruit, from the remarkable property possessed by the juice of the fruit, whence it is commonly called Marking-Nut. The genus is characterised by having polygamous flowers ; calyx 5-cleft ; petals 5 oblong, sessile ; stamens 5 ; disc urceolar ; ovary free, sessile, girded by a tumid ring ; styles 3 ; stigmas obtuse, emarginate. Nut compressed, heart-shaped, seated on a depressed thickened torus. Pericarp hard and thick, containing between the inner and outer layers cells full of a corrosive resinous juice.—*Eng. Cyc.*

(7531) SEMECARPUS ANACARDIUM. Marking Nut Tree.

Shayng cottay, Tam.
Bhela, Hind
Jadi Chettoo, Chai bin, Burm.

S. Anacardium has long been known for the corrosive resinous juice contained in the nut. This juice is at first of a pale milk-colour, but when the fruit is perfectly ripe it is of a pure black colour and very acrid, and in both respects resembles that of several other plants of the same family, as in the Cashew-Nut, species of *Rhus*, and some of the varnish-trees. The juice is employed in medicine by the natives of India, and to mark all kinds of cotton cloth. The colour is improved and fixed by a mixture of quicklime and water.—*Eng. Cyc.* This common tree is of no value as timber. A considerable quantity of the nuts are exported from the Deckan, and Mysore, as a mordant. The juice is so acrid that wood cutters are unwilling to cut the tree until after it has been killed by ringing the bark.—*Rohde. Semecarpus anacardium* in Pegu is a middle-sized tree, common in the Pegu and Tounghoo Forests. Wood white coloured, adapted for fancy work and cabinet making.—*McClelland.*

(7532) SEMECARPUS ANACARDIUM.

The Oil.

Shayng cotty yennai, Tam.
Nellajiedie noona, Tel.
Bhillawan ka tael, Hind.

The acrid and vesicating oil which is found between the two laminæ of the pericarp of the marking nut is collected and used, as a preventive against the attacks of white ants, and by native practitioners in rheumatic and leprous affections. By boiling the whole nut not divested of its pericarp, an oil is also obtained which acts as a blister, The preparation or collection either of the oil or acrid juice is liable to cause much irritation and inflammation of the hands, face, &c, of those engaged in the work.—*M. E. J. R.*

(7533) SEMECARPUS ANACARDIUM. Marking Nut, Malacca Bean.

The Nut.

Beladur, Arab.
Gheru, Can.
Bellawane, Bhela, Duk.
Bellama, Guz.
Bhallataka, Arushkara, Sans.
Bellama, Bheela, Hind.
Shayng Cottay, Shayrang cottay, Tam.
Nellajiedie, Jeedighenzaloo, Tel.

The tree bearing this nut (*Semecarpus Anacardium*), is a native of all the mountainous parts of India. The nuts are black, smooth, shining, and flattened on both sides. The acrid black-juice of the nut is employed by the natives externally to remove rheumatic pains, aches, an sprains, by rubbing a little over the affected part It is also universally used for marking cotto cloth, whence its name of marking nut, the co lour being improved, and prevented from running, by being mixed with lime water.—*Faulkner*

(7534) SEMEN CONTRA, INDIAN.—Sa heba—Undeveloped calices of Artemisa judai ca.—*Ben. Phar. Semen-contra* is a well know and much esteemed anthelmintic, especially in th round and long worm of children, (*lumbricu teres.*) The action is heating and stimulant, dos 10 grs. to ½ a drachm finely powdered, in elec tuary with honey, or diffused through milk, an taken when the stomach is empty. In infusio or decoction the bitterness is quite disgusting. catharties should either follow or accompany it use. The use of moxa, or of actual fire, to th surface of the body is a favourite practice in al savage and even half civilized nations. In Chin the down of the Artemisia Chinensis is set o fire, and the burning end applied directly to th part. In India a red hot *gool*, or hooka pastille is usually employed. In Italy a small flam of hydrogen has been lately tried, and in Ger many it is a common practice to place a particl of phosphorus on the skin, and then ignite it. Th object in all is to effect counter-irritation, an the usual cases in which it is applied are chroni rheumatism, sciatica, neuralgia, deep seated dis eases of the bones, cartilages or ligaments. I India *gools* are used by the native empirics fo almost all diseases, especially for enlargemen of the spleen and liver.—*O'Shaughnessy, pag* 417.

(7535) SEMNOPITHECUS, F. Cuvier' name for a genus of Monkeys. The canines ar much longer than the incisors ; head round ; facia angle more open than that of the Orang's ; fac flat. Limbs very long in proportion to the body ; anterior thumbs very short. Cheekpouches small or null. Callosities. Tail very long and slender.

Dental Formula ;—Incisors, $\frac{4}{4}$; Canines, $\frac{1-1}{1-1}$. Molars, $\frac{5-5}{5-5}$ = 32.

F. Cuvier observes that the canines are often nuch larger than the rest of the teeth,and consequently than they are here represented. This is exemplified in the case of *S. Maurus.* Mr. Ogilby, n his ‘Natural History of Monkeys,’ alludes o the bezoars reported by many travellers to exist in the stomachs and intestines of the Asiatic nonkeys, as confirmatory of Professor Owen's iews ; and adds that the bezoars produced by he monkeys of the Malay peninsula, and which an scarcely belong to a genus different from he *Semnopitheci,* are described as being smaller, ounder, and more powerful in their qualities han those obtained from ruminating animals.

(7536) SEMNOPITHECUS ENTELLUS, he Hoonuman (Houlman of M. Duvaucel) of he Hindoos, Lunger of the Hill Tribes. The oung are remarkable for the disproportionate ength of the extremities, the deliberate air of their novements and the tranquillity of their eyes and hysiognomy generally. Face and hands black ; ody and limbs light gray or straw-colour ; hair urrounding the face, and forming a projecting andeau over the eyebrows; a peaked beard irected outwards beneath the chin. The co- our always darker on the loins and along the pine, and becoming deeper as the animal ad- ances in age, till finally the fur, becoming mix- d with numerous black hairs, is of a rusty rown. The body at the same time becomes nore developed and muscular, and the animal, hen at its full size, is 4½ feet from the extremi- y of the muzzle to the origin of the tail, which s considerably longer than the body, of the same olour, and ends in a tuft of hair rather longer nd darker than the general hue. It is a native f Bengal, the Himalayan Mountains, Nepaul, nd Bootan. This monkey is remarkably nterwoven with the religion of the country here it is found. M. Duvaucel has given n interesting account of the careful watch hich the Bengalees kept over him to pre- ent his killing this sacred animal, hold- ng a high place among the thirty millions of ndian gods, and to save himself from dying ithin the year, which, according to popular elief, is sure to be the fate of one who puts an ntellus Monkey to death. He was harangued y the Hindoos upon the danger of injuring nimals which were no other than princes and eroes under the operation of the metempsycho- is. Unmoved by their eloquence, and eager to ossess a specimen,he levelled and brought down ‘princess.’ But the acquisition was dearly ought. The ill-fated creature had a young ne on her back, and, though shot through the eart, the mother exhausted her remains of life in throwing it into the branches of a neighbouring tree; then fell and expired at the feet of M. Duvaucel. It is but just to add that he mourned over the deed he had done. The remains of a species of quadrumanous animal allied to *Semnopithecus* were found by Captain Cantley and Dr. Falconer amongst the fossils discovered by them in the tertiary strata of the Sewalik Hills in the north of Hindoostan. (‘Geol. Proc.,’ 1838.)

(7537) SEMNOPITHECUS MAURUS, the Buding of the Javanese, Lutung utan Maure of the Malays and Europeans, Lotong of the natives of Sumatra. Dr. Horsfield describes this species as being on the whole of a stouter make than *S. melalophos,* and as having more robust extremities. One of the specimens in the Museum at the India House measures 2 feet 3 inches from the tip of the nose to the root of the tail. The face is regularly circumscribed by hairs, which are long, and closely applied to the head ; the forehead, which is gradually sloping, is entirely concealed by them. The general facial character is a flatness above, and a protrusion of the maxillæ ; but the appearance of the face differs greatly in old and young subjects. Dr. Horsfield states that the Budeng, or black species, is much more abundant than the red species, or Lutung of the Javanese (*S. Pyrrhus*) ; but the latter, both on account of its variety and comparative beauty, is a favourite among the natives. “The *Semnopithecus Maurus,*” he continues, “is found in abundance in the extensive forests of Java ; it forms its dwellings on trees, and associates in numerous societies. Troops, consisting of more than fifty individuals, are often found together. In meeting them in the forests it is prudent to observe them at a distance.

(7538) SEMNOPITHECUS MELALOPHOS. Brilliant yellow-red above,whitish below ; a tuft of black hairs on the forehead in form of a bandeau ; face blue. This is the Simpai of the Malays ; and in this species the great length of body and slenderness of the extremities, so characteristic of the *Semnopitheci,* are manifested in the highest degree. It is found in the forests of Sumatra.

(7539) SENNA.

Suna, Arab.
Sana-pat, Beng.
Nilaverie, Cyng.
Sene, Fr.
Sennablater, Ger.
Soonamukee, Guz. Hind.
Senna, It.
Cassia, Senna, Lat.
Bootallapotaka, Amshun-atydivain-diva, Sans.
Nilaverei, Nilavaghei, Tam.
Nayla tungadoo, Nila ponna, Tel.

The leaves of certain species of cassia, C. elongata ; C. acutifolia ; C. lanceolata ; and C. obovata ; all agree in certain properties ; the odour of the leaves is heavy and peculiar, taste bitter, nauseous, and glutinous, powder yellowish green. At least eight varieties of senna leaf are known in commerce in Europe; 1. The Senna palthe; 2. Senna of Sennaar, or Alexandria; 3. of Tripoli; 4. of Aleppo 5. of Moka; 6. of Senegambia; 7. the false or Arguel; 8. the Tinnevelly. The Senna palthe is prepared at Boullac, and is known to contain 5 parts of the Cassia acutifolia, 3 of C. obovata, and 2 of the Cynanchum olœifolium. It is in this variety of the drug that the poisonous leaves of Coriaria myrtifolia have been found by M. Dublanc. The *Moka* senna is chiefly cultivated for exportation to India, where it is common in all the bazars. The other foreign varieties do not require particular notice. The Tinnevelly drug is in species identical with the Moka. In Egypt the senna harvest takes place twice annually, in April and September; the stalks are cut off with the leaves, dried before the sun, and then packed with date leaves. From all parts of Upper Egypt these packages arrive at the entrepot near Boullac, called *la Palthe*. The Palteers are tax agents of the Pasha, who has of course a monopoly of this trade; they sort, mix, and adulterate the drug, and pass it into commerce through Alexandria. —*O'Shaughnessy, p.* 307. Simmonds says that several varieties of Cassia, natives of the East are grown for the production of this drug. The dried leaves of *C. lanceolata* or *orientalis*, grown in Egypt, Syria, and Arabia, the true Mecca senna, are considered the best. In Egypt the leaves of *Cynanchum Arghel* are used for adulterating senna, *Cassia obovata* or *C. senna*, also a native of Egypt, cultivated in the East Indies, as well as in Spain, Italy, and Jamaica. It is a perennial herb, one or two feet high. In the East Indies there is a variety (*C. elongata*) common about Tinnevelly, Coimbatore, Bombay, and Agra, &c. Several of this species are common in the West India islands. The plants, which are for the most part evergreens, grow from two to fifteen feet high; they delight in a loamy soil, or mixture of loam or peat. The seed is drilled in the ground, and the only attention required by the plant is loosening the ground and weeding two or three times when it is young. The senna leaves imported from India are not generally so clean and free from rubbish as those from Alexandria. They are worth from 20s. to 27s. per cwt. in the Bombay market. The prices are—Alexandria, 1½d. to 6d. per lb.; East Indian, 2d. to 3d. per lb.; Tinnevelly, 7d. to 9½d. per lb. Senna is collected in various parts of Africa by the Arabs, who make two crops annually; one, the most productive, after the rains in August and September, the other about the middle of March. It is brought to Boulack, the port of Cairo, by the caravans, &c., from Abyssinia, Nubia, and Sennaar, also by the way of Cossier, the Red Sea, and Suez. The different leaves are mixed, and adulterated with arghel leaves. The whole shipments from Boulac to Alexandria, whence it finds its way to Europe, is 14,000 to 15,500 quintals. The quantities imported for home consumption were—

	From the East Indies.	Other places.	Total.
	lbs.	lbs.	lbs.
1838	72,576	69 88	142,114
1839	110,409	6 ,566	174,275

In 1840, 211,400 lbs. paid duty, which is now only 1d. per lb. In 1848, we imported 800,000 lbs. from India; in 1849, the total imports were 541,143 lbs. The imports into the United Kingdom were, in 1847, 246 tons; 1848, 402 tons; 1849, 240 tons. Alexandrian senna (*Cassia acutifolia*). This species is said by some to constitute the bulk of the senna consumed for medical purposes in Europe. It is much adulterated with the leaves of *Cynanchum Arghel*, *Tiphrosia apollinea*, and *Coriaria myrtifolia*.

C. lanceolata and C. ethiopica furnish other species of the same article, the greater part of the produce of which finds its way to India through the Red Sea, Surat, Bombay and Calcutta, the imports into Calcutta, in 1849, having been 79,212 lbs. *C. obovata* furnishes the Aleppo and Italian drug. At least eight varieties of senna leaf are known in commerce in Europe—1. the Senna palthe; 2. Senna of Sennaar or Alexandria; 3. of Tripoli; 4. of Aleppo; 5. of Moka; 6. of Senegambia; 7. the false or Arghel; 8. the Tinnevelly. In Egypt the Senna harvest takes place twice annually, in April and September; the stalks are cut off with the leaves, dried before the sun, and then packed with date leaves. At Boulac, the drug is sorted, mixed, and adulterated, and passed into commerce through Alexandria. Alexandrian senna, according to Mr. Jacob Bell ("Pharmaceutical Journal," vol. 2, p. 63), contains a mixture of two or more species of true senna. In consists principally of *Cassia oborata* and *C. obtusata*, and according to some authorities it occasionally contains *C. acutifolia*. This mixture is unimportant, but the *Cynanchum Arjhel*, which generally constitutes a fifth of the weight on an average, possesses properties differing in some respects from true senna, and which render it particularly objectionable. The Tinnevelly senna, that most esteemed by the profession, is known by the size of the leaflets, which are much larger than those of any other variety; they are also less brittle, thinner and larger, and are generally found in a very perfect state, while the other varieties, especially the Alexandrian, are more or less broken. The leaves of the Cynanchum are similar in form to those of the lanceolate senna, but they are thicker and stiffer, the veins are scarcely visible, they are not oblique at the base, their surface is rugose, and the colour grey or greenish drab; their taste is bitter and disagreeable, and they are often spotted with a yellow, intensely bitter gummo-resinous incrustation. Being less fragile than the leaflets of the true senna, they are more often found entire, and are very easily distinguishable from the varieties which constitute true Alexandrian senna. In their botanical character they are essentially different, being distinct leaves, not leaflets, which is the case with true senna.—*Simmonds*.

(7540) *Senna.* A fine specimen of "Tinnevelly senna" cultivated near Cape Comorin, was noticed as of a superior quality. It is satisfactory to remark, that senna grown in the Southern provinces of the Madras presidency is highly esteemed in Britain, and preferred by many to all other sorts, as being both cheaper and purer.

(7541) *Senna, Indian,* LEAVES OF CASSIA ELONGATA. *Ben. Ph.* 224.

(7542) *Senna leaves,* raised at Dapooree from Tinnevelly Seed, has been found equal to the best Arabian Senna.—*Spry's Suggestions p.* 36. Senna leaves, the picking in Guzerat of sowings in August, is made in September: and Dr. Burn states that the virtues of the leaf, depend greatly on the time of the picking.—*Spry's Suggestions, p.* 43.

Senna has been distinctly known only since the time of the Arabs ; but they refer to the legumes only, though the leaves have long been employed in the East. There is, however, great uncertainty respecting the species of Cassia which yield the diffrent commercial varieties. This is owing partly to all the Senna countries not having been thoroughly explored, and partly to species having been formed from imperfect specimens, and others from leaves collected out of different samples of the Sennas of commerce. The following species seem to be clearly distinct. Dr. Royle has changed the name of Forskal's *C. lanceolata*, in consequence of the great confusion which has arisen from this name having been applied by so many authors to the sharp-leaved Senna, which is imported in such large quantities both from Arabia and Egypt, and to which he restricts it.

1. C. FORSKALII (C. lanceolata, *Forsk.* and *Lindley*, Fl. Med. p. 259). Leaflets in 4 or 5 pairs, never more : oblong and either acute or obtuse, not at all ovate or lanceolate, and free from downiness even when young ; the petioles have *constantly* a small round brown gland a little above the base. The pods are erect, oblong, tapering to the base, obtuse, turgid, mucronate rather falcate, especially when young, at which time they are sparingly covered with coarse scattered hairs. (Lindl. *l. c.*) Collected by Dr. S. Fischer in palm-grounds in the valley of Fatine, flowering at the end of February. Forskal describes this as being distinguished "glandula supra basin petioli." It was found by him at Surdud and about Mor. It is called *Suna* by the Arabs, and probably yields some of the Arabian Senna of commerce.

2. CASSIA LANCEOLATA (taken from Dr. Royle's "Illustrations of Himalayan Botany." t. 37.) This is a bushy annual, of about 2 to 3 feet in height, extremely leafy, and of most luxuriant inflorescence in a cultivated state. The stems are erect, round, smooth, a little flexuose towards the apex. The leaves alternate, abruptly pinnate. The leaflets 5 to 8 pairs, with short petioles, ovato-acute in the lower and lanceolate-acute in the upper parts of the plant, "slightly mucronulate, smooth above, rather downy beneath (especially in young leaves) with the veins turning inwards and forming a flexuose intramarginal line ; petioles without glands ; stipules softly spinescent, semihastate, spreading, minute." Racemes axillary and terminal, erect, rather longer than the leaves. Ovary linear, downy, falcate, with a smooth recurved style. Legumes (3) pendulous, membranous, flat, only slightly protuberant over the seeds, oblong, sometimes elliptical, nearly straight, with the upper margin a little curved, tapering abruptly towards the base, and rounded at the apex, of a brown colour containing from 5 to 8 white rugose seeds (2). These are figured by Gærtner, ii. t. 146. It is probably the *Cassia medica* of Forsk. p. cxi., and agrees with his specimen of "Senna Meccæ Lohajæ inveniebatur foliis 5—7 jugis, lineari lanceolatis," p. 85. of which Forskal states large quantities are yearly exported from the district of Abu-atiseh to Jidda. This species includes :

a. Tinnevelly Senna, cultivated by Mr. Hughes in the south of India ; also that cultivated by Dr Royle at Saharunpore. *C. lanceolata,* Royle, Him. Bot. t. 37. and by Dr. Wight near Madras v. fig. 60, B. and spec. in Brit. Mus. It is the *Cassia officinalis,* of Gært. and Roxburgh, Fl. Ind. ii. p. 346, which name ought to have been retained or the above *C. medica* Forsk. instead of *C. elongata* being coined, especially as this was formed from the leaves of a cultivated Indian Senna found in commercial samples. It is cultivated by Dr. Gibson, near Poona.

Dr. Burns writes that he has found the lanceolate Senna wild near Kaira in Guzerat. His cultivated specimens, if picked, would form good Senna.

b. C. lanceolata of most authors. *C. acutifolia* Hayne, ix. t. 41, Nees and Eberm. t. 345. St. and Church. Pl. 30 as C. Senna. These best represent the form of Alexandrian Senna (v. 60. A., a small leaf), and specimen in Brit. Mus. from Senaar. (*Kotschy.*) It is found in the valleys of the desert to the south and east of Syene or Assouan. and collected for the trade to Cairo forming 3-5ths of Alexandrian Senna.

c. C. acutifolia, called of Delile, Esenbeck and Eberm. t. 346. (fig. 60. c) The leaflets are narrower and more tapering towards the apex than the foregoing as might be expected in poorer soil and drier climate. Some of the Indian specimens in Dr. Rottler's Herbarium closely resemble this variety; also African specimens from Tajowra to the south of the Straits of Bab-el-Mandeb.

Dr. Royle is unable to distinguish these by any permanent characters, nor dried Senna-leaves cultivated at Saharunpore from good specimens of *Bombay Senna* (that is, ordinary Indian Senna) imported into England from India: nor these from *Suna Mukki* sent him by Dr. Malcolmson from Aden, and which he states are "the produce of Africa, but in appearance exactly resemble the Arabian Suna. In the market both are sold as one kind, and bring the same price."

3. C. OVATA of Merat, Dict. de Mat. Med. b. 613. *C. æthiopica*, Guibourt. Is probably a distinct species, as it is said to have a gland at the base of the petiole and another between each pair of leaflets. The leaflets are in 3 to 5 pairs, exactly oval acute, slightly pubescent below; the follicles are thin, pale yellow coloured, 1-3rd smaller than those of *C. obovata*. It is said to be found both in Nubia and Fezzan, and to furnish exclusively the Senna of Tripoli, Sene de Tripoli. It is extremely like a variety of *C. lanceolata*. The figure of C. Senna in Stevenson and Churchil, Med. Bot. t. 30, quoted by Dr. Pereira as representing this plant, is referred to by Dr Lindley as a good representation of C. acutifolia of Delile. But Merat and De Lens say of it: "Nous ne le connaissons que par les fruits qu'on en voit dans la commerce." M. Guibourt calls it *C. ætheopica*; but instead of referring to *C. lanceolata* of Calladon, Pl. xv. f. c as representing this species, he says that it is exactly represented by the Sene de Nubie of Nectoux, pl. 2

4. C. OBOVATA *Colladon*. Hayne, ix. 42. Nees and Eberm. 347. Diffuse herbaceous plant. Leaves equally pinnate, glandless. Leaflets 4-6 pairs (somewhat villous, Roxb.) obovate, obtuse, but slightly mucronate, unequal at the base, the terminal pair more cuneate and larger. Stipules triangular, narrow, and tapering, rather stiff and spreading. Flowers yellow, in racemes. Bracts ovate, cordate, acuminate, concave, single-flowered. Legumes broad, membranous, smooth, lunate in shape, rounded at each end, with an elevated crest over each side on both valves, so as to form an interrupted ridge along the middle of each valve. Seeds 6 to 8, wedge-shaped, rugose as in C. lanceolata —A native of Africa, from Senegal (*Fl. de Senegambie*) to the Nile; found in Fezzan by Dr. Oudney (*R. Brown*), in Egypt from Cairo to Assouan, Nubia: found in the Adel country near Sultalli (*Mission to Abyssinia*); Desert of Suez; Syria; dry parts of India, as Kaira (*Burns*); Guzerat, Dekkan (*Col., Sykes*), near Delhi, and Valley of Rungush, near, Peshawar (*Falconer*); high dry uncultivated lands of Mysore (*Roxburgh. Wight*). It has been cultivated in Italy (*Sene d' Italie*), and forms 3-10ths of Alexandrian Senna.

This species is very distinct, in its obtuse obovate leaves and crested legumes, from the preceding acute-leaved species. *C. obtusa* Roxb: was probably described from young legumes, as Dr. Royle, like Dr. Lindley, has compared good specimens from Mysore with others from Africa. The *obtusata* (fig 60 H.) of Hayne does not seem to differ sufficiently from his *C. obovata* (fig 60, G.) It is possible, however. that there are two very similar species in Africa. Mr H. Grant, late of the India House, has favoured Dr. Royle with a specimen in flower, collected by him in February at Philæ, which has upon it *both* obovate (H.) leaflets and some which are ovate and acute (G)! Lieut. Wellsted's collection contains a specimen from the coast of Arabia, of which the leaflets are obtuse, elliptic, and hairy.

The Sennas of commerce may be arranged as follows.

1. TINNEVELLY SENNA, first cultivated in the district of that name, in 12° of N. lat. by the late Mr. Hughes, from seed probably obtained from Arabia or picked out of *Suna Mukki*, as was done by Dr. Royle when he cultivated Senna at Saharunpore. (*v.* Himal. Bot. p. 186, t 37, and Trans Med. Soc. of Calcutta, v. p. 433). That author also grew Senna from Tinnivelly seed sent to him by Sir C. since Lord Metcalfe; but he did not find the smallest difference between the two when grown in the same situation. The Tinnevelly Senna is well-grown and carefully picked; the leaflets are of a fine, rather lively green colour; thin, but large, being from one to two inches in length, truly lanceolate. This kind is "highly esteemed in Britain, and is quickly displacing all the other sorts in Edinburgh, and many other cities in Britain." (Christison.) Dr. A. T. Thomson says of it, it is mild in operation, certain as a purgative, and operates without griping. It is now cultivated by Mr. Hughes' successor.

Saharunpore Senna, the same kind of Senna cultivated at Saharunpore, differed only in the leaflets being smaller, as might be expected from the more northern latitude (30°). These Dr. Royle prescribed in the hospitals at Saharunpore, and found them effective as a purge, and operating without producing inconvenient nausea or griping, Mr. Twining, after trying them in forty-five cases in the General Hospital at Calcutta, says, in his report to the Medical Board: "From these trials. I am disposed to consider the Senna now under trial equal to the best I have ever seen."

Madras Senna. Senna is now imported also from Madras, the produce of that Presidency. In 1843-44, I find 11,536 lbs. were exported to this country, having been previously imported into Madras from Tinnevelly, where it is cultivated by the natives, and is of the same nature as Mr.

Hughes' Senna, though not so well grown nor so carefully picked. Dr. Christison says of it the leaflets are longer than those of Bombay Senna, and not so taper-pointed, but otherwise differ only in being better preserved, and being more active, are more esteemed.

Dr. Searle, in a communication to the India House, says of this Senna, that "now furnished to the profession of the Madras Government is in my experience quite as good as the Alexandrian," "every leaf of the Indian being of the genuine spear-shaped species."

2. BOMBAY or Common Indian SENNA, *Suna Mukki* of the natives, is first imported into Bombay from the Arabian Gulf:

319,728 lbs. in 1837 39.	570,426 lbs. in 1838-39.
Re-exported to Great Britain,	262,284 lbs in 1838-39.

That this Senna, forms a large, if not the argest proportion of what is consumed in this country, is not only evident from the above importation, but also from a comparison with the whole quantity of the other Senna imported, as given by Dr. Pereira.

	1838.	1839.
From East Indies	72,576 lbs.	110,409 lbs.
From other places	69,538 ,,	63,766 ,,

Some of this Senna is no doubt produced in Africa, as stated above by Dr. Malcolmson; a good deal of it in Arabia, probably by *Cassia anceolata*, and some perhaps by *C. Forskalii.* The leaflets are thin, lanceolate, usually entire, about an inch or an inch and a half in length, narrower than either the Tinnevelly or Saharunpore Senna, probably from growing in a poorer oil and drier climate. They are of a pale green olour, often with dark brown coloured leaflets ntermixed, also some pods, and many leafstalks, with occasionally other impurities. The good pecimens of this Senna are, however, of excellent uality, and its commercial and medical value would be much increased, if the finest leaflets were picked out. It is in constant use in hospi al practice in India, and generally highly approv d of. Dr. Royle prefers them for all purpos s to the following kind as found in commerce.

3, ALEXANDRIAN SENNA is an excellent ind, when the genuine lance-shaped leaflets ave been picked out; but that commonly em loyed in England is a mixed and very im ure kind, being made up of the leaflets, much roken, of *C. lanceolata* and of *C. obovata*, with ome pods and broken leaf-stacks, and also with eaves of other plants. It should be used only fter having been carefully picked, as directed in he E. P. Picked Alexandrian Senna is of a ale green colour, with a faint smell. The leaf ets are broad-lanceolate, the two sides unequal; hey are thicker and shorter than the Indian Sennas.

The lanceolate Senna of Upper Egypt, Nubia, nd Senaar, yields two crops annually, the plants eing cut down in spring and autumn, dried in the sun, when the leaves are stripped off, packed in bales, and sent to several *entrepots*, and finally to Boulac in the vicinity of Cairo. Of the lanceolate Senna *five* parts are here mixed with *three* parts of the leaflets of *C. obovata*, brought from other parts of Egypt and even from Syria, and also with leaves (*two* parts) of *Cynanchum Argel*. This mixed Senna is that exported from Alexandria. On the Continent a further addition is made of the leaves of *Colutea arborescens* and of *Coriaria myrtifolia.*

Dr. Pereira states that, "under the name of *heavy senna* he has met with *argel* leaves, which were sold at a higher price than ordinary senna," and Dr. Christison mentions what indeed may often be seen, that is, Argel leaves left intermixed even in what is called Picked Alexandrian Senna. This Senna is often called "Sene de la Palthe."

4. TRIPOLI SENNA, is brought from Fezzan to Tripoli. This has the general appearance of Alexandrian Senna, but is less esteemed, though it is a more pure Senna, probably because the leaflets are more broken down, and all the leafstalks have not been removed. The leaflets are shorter and less pointed than in lanceolate Senna —indeed, more ovate; hence this Senna is said to be produced by *C. ovata* (æthiopica); but it also contains leaflets of *C. obovata*, which species was found in Fezzan by Dr. Oudney.

5. ALEPPO SENNA is now seldom imported into Great Britain. It consists of the leaflets of *C. obovata*, as do some other kinds, such as ITALIAN SENNA. Dr. Ainslie says that the *obovate* was the only kind of Senna met with in India, meaning the Peninsula of India; for it is not met with in the Bengal Presidency; nor, according to Dr. Searle, is it used in that of Madras at the present day. It is less effective as a purgative, and apt to create nausea and griping.

Adulteration. Commercial Senna is prepared for use by picking out the leaflets, and rejecting the leaf stalks, also extraneous matter, as dust, date-stones, &c., as well as the leaves of the other plants. The legumes, however, possess the cathartic properties of the leaves to a considerable extent, and were alone used by the original Arabs; and there is no reason to believe that the stalks are inert. The most important adulterations are, however, the leaves of other plants. Those of the *Argel* (D.) may be distinguished by being lanceolate, equal on the two sides of the midrib, thick, leathery, and paler. They operate very dubiously as a cathartic, but occasion griping and protracted sickness. (C.) Those of *Tephrosia Apollinea* (F.) are obovate downy, and the veins proceed transversely from the midrib to each margin of the leaf without forming a marginal vein. The leaves of *Coluta arborescens*, or Bladder Senna, are ovate, but equal at the base. Those of *Coriaria myrtifolia* (E.) are astringent, usually broken down, and marked on each side of the midrib with a strong lateral nerve. As the systematic adulteration of Senna in Egypt with the leaves of other plants is objectionable, and has been so noticed by the Pharmaceutical Society, the most efficient method of stopping it would be to purchase only the pure African and Arabian Sennas which come to us by Bombay, instead of (unless it has been picked) that which is called Alexandrian from its place of export (*v.* P. J, ii. p. 63.) In India a good substitute for Senna is afforded by *Rae Suna.* (*v.* COMPOSITÆ.)—*Royle, p.* 361.

(7543) SENSITIVE PLANTS is a term commonly applied to those species of plants that possess the property of visibly moving their leaves when they are touched or otherwise stimulated. This term is not applied generally to plants in which any movements can be observed; for the power of moving under the influence of certain external stimulants is a very general property of the tissues of plants, and especially of the flowers. There are a great number of species of plants of various families, that possess the power of moving their leaves under the influence of a slight touch; that which is best known is a plant belonging to the order *Leguminosæ*, called *Mimosa pudica*. It is a native of tropical climates in moist districts, where it is exposed to a temperature of between 70° and 80° Fahr. It is in its native districts where its excitability is seen to the greatest perfection. A knock upon the ground at a short distance from the plant is sufficient to produce an influence on the leaves; and Von Martius says, that at Rio Janeiro the falling of horses' feet by the way is sufficient to set whole masses of Mimosas in motion. When in England, the motions of the plant are always best displayed in high temperatures. The movements are not alone produced by mechanical irritants, for if various corrosive substances, as bichloride of mercury, sulphuric acid, caustic potash, &c., are applied to the knots of the joints, the same phenomena are observed. The removal of the plant to a higher temperature will produce the same result, as well as exposing it to a lower temperature or a draught of cold air. They are destroyed by the application of chloroform and other anæsthetic agents. Besides the *Mimosa pudica* there are several other species belonging to this genus that possess the same property, though not in so remarkable a degree. Amongst them may be named *M. Sensitiva*, *M. viva*, *M. casta*, *M. asperata*, *M. quadrivalvis*, *M. pernambucana*, *M. pigra*, *M. humilis*, *M. peltata*, *M. dormiens*. Species of other genera of the same natural order *Leguminosæ* exhibiting these movements are *Smithia sensitiva*, *Æschynomene Indica*, *Æ. pumila*, and *Desmanthus stolonifer*. The locust tree when its branches are roughly shaken closes up its leaves, and the same has been observed of *Gleditschia triacantha*, and it is probable that close observation during hot weather would prove that other leguminous plants possess this property. Another family of plants that exhibit sensation when touched or stimulated is *Oxalidaceæ*. The *Oxalis sensitiva*, called by De Candolle on account of its sensitive properties *Biophytum*, has long been known to possess this property. *Averrhoa bilimbi* and *A. carambola* are both plants belonging to *Oxalidaceæ*, and have been described by travellers as possessing the property of folding their leaves on the application of a stimulus. But it is not only in these species that this property resides, for Professor Morren of Liege has observed it to occur more or less in all the species of the genus *Oxalis*. His observations were first made on the *Oxalis stricta*, which, if hit smartly on a warm day, will contract its leaves and assume a position as in the ordinary sleep of the leaves of these plants. He has also observed the same movements in *O. Acetosella* and *O. corniculata*, and many extra-European species. The movements in these plants consist in the folding up of their leaves, so that the two halves of the leaf approach each other by their superior surface. The midrib is also slightly bent, so that its inferior surface presents a convexity; and the petioles of the leaflets bend downwards, so that the leaf, when irritated, becomes dependent. (Morren, 'Notes sur l'Excitabilité et le Mouvement des Feuilles chez les Oxalis,' in the 6th volume of the 'Bulletins de l'Académie Royale de Bruxelles.') In the family *Droseraceæ*, or Sun-Dews, are some plants which exhibit a considerable amount of irritability. The leaves of *Dionæa muscipula*, or Venus' Fly-Trap have the remarkable property of contracting upon insects that may happen to alight upon their surface. None of the Sun-Dews inclose insects in their leaves in this manner, but the surface of their leaves is covered with long hairs, which secrete a viscous matter. When any insect settles upon the leaf, it is entangled with the viscous secretions; and before it has time to escape, the hairs exhibit a considerable degree of irritability, and curving round, pin the animal down on the surface of the leaf. Other instances of vegetable irritability occur in the *Berberis vulgaris*, *Mimulus*, and *Stylidium*.—*Eng. Cyc.*

(7544) SEPIADÆ (Σηπία), a family of Cephalopodous *Mollusca*, including the forms which are ordinarily known under the name of Cuttle-Fishes. Dr. Leach divided the group of Cuttles into two families, the Octopods and the Decapods. The forms belonging to the first division are described under the article OCTOPODA.

(7545) The *Decapoda* are thus defined. Under this division are placed the *Teuthidæ*, or Calamaries, and the true *Sepiadæ*, or Cuttle-Fishes, properly so called.

(7546) *Sepioteuthis* (De Blainville).

(7547) *S. Sepiacea.* This species is figured in the article Cephalopoda under the name of *Sepia officinalis,* to which however it bears a very close external resemblance, so close indeed that authors generally place it immediately before that species. Thirteen species of the genus *Sepioteuthis* have been described. They are inhabitants of the West Indies, the Cape, the Red Sea, Java, and Australia.

(7548) *Loligopsis* (Lam.) There are eight species of this genus found in the North Sea, Atlantic, Mediterranean, India, Japan, and the South Seas.

(7549) *Onychoteuthis* (Lichtenstein).

There are about six species of *Onychoteuthis* ound in the Atlantic, Indian, and Pacific ceans.

(7550) *Sepia* (Lam.)—Animal with an oblong lepressed body, with two narrow lateral fins xtending its whole length ; mantle free at its nterior margin ; the acetabula supported by horny hoops with the margin entire or very minutely denticulated.

(7551) *Sepia officinalis.* This is the Common Cuttle-Fish, so well known on our coasts, nd whose shell is so often thrown up by the vaves on the beach. The ink (nigræ succus oliginis) is common to this and other species f cephalopods. This fluid is not only ejected s a defence to colour the water in order to avour the escape of the animal, as was well nown to the ancients (Oppian, 'Halient.,' iii. ; Pliny, 'Nat. Hist.,' ix. 29), but as a direct neans of annoyance. That the juice was used y the ancients as ink is evident from many passages : we content ourselves with a reference o that above given, and to the lines in the raphic description of the idler by Persius. 'Sat.' iii., lin. 10, et seq.) The flesh of the aked cephalopods was rather esteemed of old, s it is indeed now in Italy and other countries. Aristotle declares that these animals are in the ighest season when pregnant, and those who ish to taste a cuttle-fish sausage, will find receipt for making that savoury viand in Athenæus. Mr. F. D. Bennett states that ne Fe, or Cuttle-Fish, is considered a luxury y all classes of the Sandwich Islanders nd that when fresh and well cooked it is an xcellent food, and in consistence and flavour ot unlike the flesh of a lobster's claw. ('Narrative of a Whaling Voyage round the Globe,' ondon, 1840.)

(7552) SERENGE, a Dyeing Seed.

(7553) SERGE. A quilted woollen cloth, nade in Devonshire and other parts of England. —*Faulkner.*

(7554) SERISSA. Acacia Serissa. In hina, the Serissa is cultivated around flower beds nd parterres like the box.—*Fortune.*

(7555) SERON. A kind of package, formed of ieces of wood, fastened with hides.—*Faulkner*

(7556) SEROONAVALPOO. A drug.

(7557) SERPENTINE, a rock regarding whose origin geologists have differed. It is described as an irregularly over lying mass in the Lizard district of Cornwall, as a dyke at Portsoy, and as nodular aggregations in the granite of Aberdeenshire. The relation in which it stands to Diallage Rock (a compound of diallage and felspar) is very intimate, both in the Alps, in the Shetland Isles, and in Cornwall. In fact the composition of these rocks is scarcely more different than may be seen between largely crystallised and fine-grained greenstone. Serpentine is a very handsome stone when polished. Beautiful specimens from Cornwall, and other parts of England and Ireland, may be seen in the Museum of Economic Geology, London. When mixed with limestone it constitutes the Verd-Antique Marble. It does not wear well, although at first it receives a fine polish. Chromic iron is usually found disseminated through it. Dr. Jackson of America has shown that Epsom salts or sulphate of magnesia may be profitably manufactured from Serpentine. —*Tomlinson.* One species called noble serpentine, green and translucent, is valued as an ornamental stone. (*Waterston*).—*Faulkner.* Precious serpentine exists in the Hookhoong valley, north-west of Ava, whence it is exported to China, and brought into the southern parts of the empire, but it has not yet been discovered in the Tenasserim provinces.—*Mason.*

(7558) SERRANUS, a genus of Fishes belonging to the family *Percidæ.* It has a single elongated dorsal fin, the rays of the anterior portion spinous, the other flexible ; branchiostegous rays 7 ; small teeth in both jaws on the palatine bones and the vomer, some elongated teeth among the smaller ones ; cheeks and operculum covered with small scales ; preoperculum serrated ; operculum ending in two or three flattened points projecting backwards.—*Eng. Cyc.*

(7559) SERRATULA ANTHELMINTICA.
Worm Saw-wort Somraj, Hind.

Somraj Grows wild in Kotah.—*Genl. Med. Top. p.* 206.

(7560) SERRURIA. Proteaceæ. This genus of plants require the same treatment as the Protea.—*Riddell.*

(7561) SESAMUM (Σησαμον), a genus of Plants belonging to the natural order *Sesamaceæ* sometimes called *Pedalineæ,* containing only few genera and species. It is distinguished by having a 5-parted calyx ; corolla with a short tube ; bell-shaped throat ; and the limb quinquifid, somewhat bilabiate. Stamens 4, didynamous, with the rudiments of a fifth stamen ; stigma bilamellate ; capsule oblong, 4-celled, 2-valved ; seeds numerous. The species, though now cultivated in many countries, are supposed to have been originally natives of India. They form annual plants, with opposite and alternate leaves, and axillary solitary flowers. The species are by some considered to be five in number, that is, *S. orientale*, *S. Indicum*, *S. luteum*, *S. laciniatum*, with *S. radiatum*, said to be a native of Guinea. Others consider them all to be varieties of one species. These are cultivated in various countries, but especially in India, Egypt, and Syria. They have also been taken to the West Indies, where the plant is called Banglo and Oil-Plant. Sesamum seeds are sometimes added to broths, frequently to cakes by the Jews, and likewise in the East.—*Eng. Cyc.* Dr. Wight gives Sesamum laciniatum and prostratum and Voigt gives S. Orientale with a variety. There seems, however, to have been considerable confusion arising from various names having been given to varieties of the same plant, viz: the S. Orientale of Roxburgh, to which we adhere, taking Voigt's Botanical names and Roxburgh's description.

(7562) SESAMUM ORIENTALE, Roxb. *Fl. Ind. Vol.* III. *p.* 160. Sesamum indicum, Linnæus. S. Trifoliatum, Mill. dict. No. 3. S. Luteum. Retz. S. Laciniatum, Willd.

Schitelu. RHEEDE.
Σησαμον. GREEK.
Black seeds, Kala til, white seeds, Suffed til, HIND.
Duhn, ARAB.
Roghen, PERS.
Tila, SANS.
Novu, TELIN
Gingellie, ENGLISH.

The Oil.

Nal ennai, TAM.
Munchie Noonay, TEL.
Meetha Til ka tel, HIND.
Jiritch, ARAB.
Meeta tel: Til ka-tel, Guz HIND.
Kurit Schuk, PERS.

The Seed.

Sumsum. ,,
Bareek Til, DUK.
Wull ellu, also, Ellu, CAN.
Teel, Jingelly, Guz. HIND
Kunjed, PERS.
Taila, SANS.
Benjam, SUMATRA.
Yellow, TAM.
Koorvelloo, TAM.
Nowoolo, TEL.

An annual plant growing all over India, but cultivated in Egypt, the Levant, West Indies and South America.—*Voigt*. This species or variety is by far the most generally cultivated in the warmer parts of Asia. It is annual and in a good soil grows generally to be about three or four feet high. Roxburgh never found it in a wild state, (*Roxb.*), but Dr. Riddell tells us that in the Dekhan, the Sesamum Orientale or Gingelie Plant is a common plant springing up in waste places, and flowering towards the close of the rains.—*Riddell*. Roxburgh states that his figure of this plant, called Sesamum indicum by Linnœus, is the *Krishna til* of the Hindoos, which Roxburgh regards a variety of his S. Orientale. It is larger, more ramous, the stem and branches tinged with a rusty reddish colour, the leaves a darker green but in form and structure the same. The flowers are deep tinged with red and seed of a darker colour. Great difference, however, appears, in the seed and harvest time, Sesamum Orientale being sown in Bengal in February, and the crop got in three months afterwards, so that the dues and the little remaining moisture of the earth, are the only sources of humidity by which it can benefit, as this is generally a period o drought. *Sesamum indicum* is sown on higl places, about the beginning of the rains, June and the crop cut down in September.—*Roxburgh*. It will be seen from the above that there are two spiecies or strongly marked varietie of this plant, under cultivation. It may be sai indeed, that the Sesamum is extensively cultivate in Southern Asia, for the oil, which is expresse from the seeds which are slightly oval, small, tasteless and inodorous, and that there are two kind distinguished, *black* and *white* or *yellow*, whic possess the same properties, and in commerce ar met with both in a mixed and separate state Gingelly seed is largely exported to England an France, but in India, this oil is perhaps consumed by the natives of India to a greater exten than any other and is second only to cocoanu oil in its importance as an article of commerce It is extensively cultivated throughout the whol of the Madras Presidency, and has been exporte from Madras as follows.

Gingelly Seed.

Years 1847-48.	Year 1848-49.
Qr. 17,518...Rs. 160 134	Qr. 8,594......Rs. 1,02,726
Years 1849 50.	Years 1850 51.
Cwt. 1,44,125 Rs. 299,412	Cwt. 2,27,779...Rs 4,37,185
Years 1851-52.	Years 1852-53.
Cwt. 1,09,414 Rs 302,559	Cwt. 2.51 613...Rs. 5,31,664

Gingelly Oil.

Year 1847-48.	Year 1848-49.
Gl. 19,520.....Rs. 14 766	Gl. 14 686. ....Rs. 11,535
Year 1849-50.	Year 1850-51.
Gl. 52,721.....Rs. 36 294	Ge. 77,232...........Rs. 48,605
Year 1851-52.	Year 1852-53.
Gl. 46,196.....Rs. 26,722	Gl. 72,607... ......Rs. 43 608

Of the gingelly seed exported from Madra in 1852-53, the United Kingdom receive cwt. 12.713—Ceylon, cwt. 590—France, cwt 2,87,225—Pegue, cwt. 741—Bombay cwt, 11 —Malacca, cwt. 33 and Travancore, cwt: 14 Of the quantity of oil (72,607 gals.) exported i the same year—gals. 42,043 were shipped t the United Kingdom—gals. 2,963 to Ceylon—gals. 4,232 to Mauritius and Bourbon—gals. 19,698 to Pegue—gals. 46 to Bengal—gals. 27 to the French (Indian) ports, an gals. 3,593 to Malacca.

Mode of preparation.—The great dispa rity of color observed in the specimens o this oil is to be attributed to the mode of preparation. The method sometimes adopted is that of throwing the fresh seeds, without any cleansing process, into the commor mill, and expressing in the usual way. Th oil thus becomes mixed with a large portior of the coloring matter of the epidermis of th seed, and is neither so pleasant to the eye nor so agreeable to the taste, as that obtaine by first repeatedly washing the seeds in col water, or by boiling them for a short time, until the whole of the reddish brown coloring matter is removed, and the seeds have become perfectly white. They are then dried in the sun, and the oil expressed as usual. This process yields 40 to 44 per cent. of a very pale straw colored sweet smelling oil, an excellent substitute for olive oil.

Uses.—In India, it is chiefly used in cookery, in anointing the person, for making soap, and for burning in lamps. In England, it is chiefly used for the manufacture of soap, and for burning in table-lamps, for which it is better suited than cocoanut oil, owing to the lower temperature at which it congeals. *Price.*—Value in England (January 1855) £47.10 per ton. In different parts of the Madras Presidency the price of this oil varies from Rs. 1 5 0 to Rs. 6 0 0 per maund of 25lbs In S. Arcot it is procurable at Rs. 27 12 5 per candy. The prices per maund of this oil, at the undermentioned stations, for the quarter ending 31st October 1854, were as follows.

Arcot ... ... Rs.	3	8	0	Madura, ... Rs.	5	8	3
Bangalore, ... ,,	3	7	3	Mangalore, ... ,,	4	1	8
Bellary, ... ,,	3	2	0	Nagpore, ... ,,	1	12	0
Berhampore,..... ,,	2	8	0	Palamcotta, ... ,,	4	12	0
Cannanore, ... ,,	6	0	0	Paulghaut, ... ,,	3	7	0
Cuddapah,........ ,,	2	13	0	Samulcotta, ... ,,	2	10	8
Jaulnah, ... ,,	2	6	0	Secunderabad, ... ,,	2	3	11
Jubbulpore, ... ,,	1	5	0	Trichinopoly, ... ,,	4	1	8
Madras ... ... ,,	3	14	0	Vellore, ... ,,	3	14	0
Masulipatam, ... ,,	3	9	0	Vizagapatam, ... ,,	3	2	0

Second sort Gingelly Oil, erroneously called "Rape," (Kharasanee yelloo), is obtained from the red seeded variety.—This oil differs but little from the one above mentioned. In Tanjore, it is procurable at Rupees 3 0 0 per maund.

The following particulars concerning the two varieties of plant, yielding this important oil have been furnished by F. Copleston, Esq., Rajahmundry.

First sort Gingelly. The gingelly seed *par excellence* is the produce of the plant, which is sown in the month of March, after the rice crop, and is irrigated twice, once at sowing, and once afterwards. The seed which is *black*, and is called 1st sort gingelly, from the fact of its yielding the largest per centage of oil, ripens in May, and sells at the rate of Rs. 60 per candy of 500 lbs. The oil obtained from both varieties, sells at the same price, viz. Rs. 2 14 6 to 3 per maund of 25 lbs. according to quality.

Second sort Gingelly is sown in June, and produces a red seed. The plant although a little larger resembles in most respects the former, it has, however, a somewhat longer leaf, and the flower differs a shade or two in color. A candy of 500 lbs. of this seed sells at Rs. 57 8 0. The price of the oil is the same as that of gingelly. This seed has of late been exported to France, in consequence of which the present price is double what it was three years ago.—*M. E. of* 1855.

It will have been seen that of this small annual plant there are two varieties or according to some, species. Sesamum orientale, the common sort; and S. indicum, a less robust kind, cultivated at a different season, both natives of Southern Asia. S. indicum bears a pale purple flower, and S. orientale has a deep red blossom. It is the latter which is chiefly grown in the Peninsula, and the seeds afford the Gingelly oil or til ka tael already extensively known in commerce in the East. The expressed oil is as clear and sweet as that from almonds, and probably the Behens oil used in varnish, is no other. It is called by the Arabs "Siriteth," and the seed, "bennie" seed, in Africa.

S. orientale is grown in the *West Indies* under the name of "wanglo." It is said to have been first brought to Jamaica by the Jews as an article of food. 1,050 bags of gingelly, *til*, or sesame seed, were imported into Liverpool, in 1849, from the East, South America, and Africa, for expressing oil and 3,700 bags in 1850. There are two kinds of seed, light and dark, and it is about the same size as mustard seed, only not round.

A hectare of land in Algeria yields 1475 kilogrammes of seed, which, estimated at 50 cents the kilogramme, amounts to 737 francs, whilst the cost of production is only 259 francs, leaving a profit of 478 francs (nearly £20). The oil obtained from this seed is inferior to good olive oil, but is better adapted for the manufacture of soap. This plant is not unlike hemp, but the stalk is cleaner and semitransparent. The flower also is so gaudy, that a field in blossom looks like a bed of florist's flowers, and its aromatic fragrance does not aid to dispel such delusion. It flourishes most upon land which is light and fertile. The fragrance of the oil is perceptibly weaker when obtained from seed produced on wet, tenacious soils. A gallon of seed seems to be the usual quantity sown upon an acre.

In *Bengal*, *S. orientale* is sown during February and the crop harvested at the end of May; but *S. indicum* is sown on high, dry soil, in the early part of the rains of June, and the harvest occurs in September.

About *Poonah* it is sown in June and harvested in November.

In *Nepaul* two crops are obtained annually; one is sown as a first crop in April and May, and reaped in October and November; the other as an autumn crop, after the upland rise in August and September, and reaped in November and December. In Mysore, after being cut it is stacked a week, then exposed to the sun for three days, but gathered into heaps at night; and between every two days of such drying, it is kept a day in the heap. By this process, the pods burst and shed their seeds without thrashing. The seeds contain an abundance of oil, which might be substituted for olive oil; it is procured from them in great quantities, in Egypt, India, Kashmir, China, and Japan, where it is used both for cooking and burning. It will keep for many years and not acquire any rancid smell or taste, but in the course of a year or two becomes quite mild, so that when the warm taste of the seed, which is in the oil when first expressed, is worn off, it is used for all the purposes of salad oil. It possesses such qualities as fairly entitle it to introduction into Europe; and if divested of its mucilage, it might perhaps compete with oil of olives, at least for medicinal purposes, and could be raised in any quantity in the British Indian Presidencies. It is sufficiently free from smell to admit of being made the medium for extracting the perfume of the jasmine, the tuberose, narcissus, camomile, and of the yellow rose. The process is managed by adding one weight of flowers to three weights of oil in a bottle, which being corked is exposed to the rays of the sun for forty days, when the oil is supposed to be sufficiently impregnated for use. Gingelly oil, is used in India to adulterate oil of almonds. The flour of the seed, after the oil is expressed, is used in making cakes, and the straw serves for fuel and manure. The oil is much used in Mysore for dressing food, and as a common lamp oil. From 200 to 400 quarters under the name of Niger seed are imported annually into Liverpool for expressing oil. Three varieties of Til are extensively cultivated throughout India, for the sake of the fine oil expressed from their seeds, the white seeded variety, the parti-colored, and the black. It is from the latter that the sesamum or gingelly oil of commerce is obtained. Sesamum seed contains about 45 per cent. of oil. Good samples of the oil were shown at the Great Exhibition from Vizianagram, Ganjam, Hyderabad, Tanjore, the district of Moorshedabad, and Gwalior The gingelly seed is stated to be worth about £4 per ton in the Northern Circars.—*Simmonds' Comml. Products, page* 535. Dr. O'Shaughnessy says that the sesamum plant is universally cultivated in the East for the oil expressed from the seeds a very sweet oil (siritch, *Arab.*) which is much used as an article of diet, for frictions, and lighting. The oil-cake mixed with honey and preserved citron is esteemed an oriental luxury. The leaves of the plant are used as poultices.

Nine pounds of the seed yield two quarts of perfectly sweet oil, which will keep many years without becoming rancid; the oil made in Persia, and thence largely exported, is called *Kurit schuk*. Sesamum oil is of the sp. gr. 911, insoluble in alcohol, readily saponifies with alkalies, and combines with the oxide of lead. For all purposes of medicine and pharmacy it is when well prepared quite equal to the best olive oil.—*O'Shaughnessy, p.* 479. Both the white and dark seeded varieties are cultivated in Ajmere but do not thrive well.—*Genl. Med. Top. p.* 200. Ainslie tells us it is much used by the Natives of India, in preparing their victuals and when fresh made is by no means unpleasant, and that it is highly esteemed amongst the Japanese who cultivate the plant from which the seeds are obtained that yield it in great abundance.—*Ainslie's Mat. Med. p.* 266.

Tenasserim. The sesamum plant is largely cultivated in Tenasserim by the Karens, who bring the seeds to market and sell them to the Burmese, and they express the oil. The seeds are said to have the same property as linseed, and the oil to be a good substitute for olive oil. The natives use it in curries, and also burn it for lights.—*Mason.* Sesamum indicum, has been lately introduced into the United States where it yields about 2½ gallons of oil to the bushel: the produce being about 20 bushels to the acre. Flax seed yields a gallon to the bushel. The leaf of the plant has been found an excellent remedy in the bowel complaints of children and adults, and for this purpose put or dip three or four leaves in water which they render micilaginous, but do not impart any unpleasant taste. The negroes cultivate it for food using the parched seeds with their meats.—*Ag. Rep. for* 1854 *of Com. Patents p.* 226. See GINGELLY OIL.

(7563) SESBANIA, a genus of plants belonging to the natural order *Leguminosæ*, which is so named from the Arabic name of the species which is indigenous in Egypt. The rest are found in the equinoctial parts of the world, but the most remarkable in India. The genus is characterised by having a 5-cleft or 5-toothed calyx: the standard of the corolla roundish, larger than the keel, which is obtuse, 2-edged at the base; stamens diadelphous (9 and 1), with the sheath auricled at the base; legume elongated, slender, torulose, many-seeded. The species form shrubs or herbs with abruptly pinnate leaves, many pairs of leaflets, cauline stipules lanceolate, and the petiole ending in a bristle point. Flowers axillary, racemose, usually yellow.—*Eng. Cyc.*

(7564) SESBANIA ACULEATA. *Syn.* ÆSCHYNOMENE CANNABINA, Roxb, 'Fl Ind.,' iii, p. 335, and Æ. SPINULOSA, do., p. 333; LEGUMINOSÆ).

Dhunchee, HIND.

Sesbania aculeata, herbaceous, annual, erect, sparingly branched, glabrous; stem and petioles usually sprinkled with minute cartilaginous points; leaves eight to ten times longer than broad; leaflets twenty to forty pairs, linear, obtuse, mucronate; racemes axillary, peduncled, erect, lax, often about half the length of the leaves; few-flowered; flowers pretty large (more than half an inch long), on slender pedicels;

corolla about four times the length of the calyx; legumes erect, nearly terete, sharp-pointed. The natives of Bengal familiarly employ and highly esteem a fibre which is known to them by the name of *Dhunchee*, *Dhunicha*, and *Dhunsha*. It is produced by a plant which Dr. Roxburgh thought was the same as the *Æschynomene cannabina* of Konig. This was described by Retz, and stated to be a native of the Malabar coast, and that its stems yielded a strong and useful fibre, as a substitute for Hemp. Messrs. Wight and Arnott, in their 'Flora of the India Peninsula,' consider it to be identical which *Sesbania cochinchinensis*, which they have from China. Dr. Roxburgh states that he had not found his plant in a wild state, but that, in various parts of Bengal, it was cultivated for the fibres of its bark, which form a coarse substitute for Hemp. Messrs. Wight and Arnott (l. c.) unite the plant described by Dr. Roxburgh with one which is very common in all parts of India in the rainy season, the *Sesbania aculeata* of Persoon, and which is called Juyunti in Bengal, and *dhundain* in North-West India. It springs up in rice-fields, and other wet cultivation, during the rainy season. These two varieties are thus described by Messrs. Wight and Arnott, under the name of *S. aculeata*. Dr. Roxburgh gives the following general directions for its culture. The soil is generally low and wet, and not requiring much preparation, as the plant is hardy, growing from six to ten feet, and rapid in growth. This renders it advantageous to cultivate, especially as it is considered a meliorating crop. The time of sowing is when the soil has been moistened by the first showers of April or May. About thirty pounds of seed are allowed to the acre, and less weeding is required than for *Jute*. The crop is ready to cut in September and October, though the fibre does not suffer if left standing till the seed is ripe, in November. The process of steeping and cleaning the fibre is similar to that required for *Sunn*, that is, *Crotalaria juncea*. The general produce of an acre is from one hundred to one thousand pounds of ill-cleaned fibre, the current price somewhat less than that of *Paut*, viz., *Corchorus olitorius* and *capsularis*. The expense of cultivation, including land rent, is about nine rupees. This plant, generally cultivated about Calcutta during the rains, grows to the height of from six to ten feet, the fibres are long (six to seven feet), but coarser and more harsh than those of Hemp, unless cut at a very early period. From its great strength it is well calculated for the manufacture of cordage and cables. In Bengal, the fishermen make drag-ropes to their nets of this substance, on account of its strength, and durability in water. Indeed by the Bengalese it is considered more durable in water than either *Sunn* or *Paut*. It has been observed to Dr. Royle by one gentleman well acquainted with this fibre in India, that he was at a loss to know why the Dhunchee remained so much neglected in Great Britain, as it is really a very excellent fibre for common cord and twine purposes, and certainly very much superior in strength and durability to Jute. It is also a much hardier plant than Jute; the latter, indeed, being rather an uncertain crop, for the production of the fine, long, silky fibre, so much called for in England. Another gentleman observed, that though rather wiry it was strong, and chiefly remarkable for its contraction when wetted, so much so, that it would even carry away the mainmast of a ship by mere contraction. Mr. Deneef, the Belgian farmer employed in India, presented samples of the Bengal Hemp, called *Dhuncha*, to the Agri-Horticultural Society, in November, 1840, and stated that they had been dressed after the Belgian mode. A begah, he says, will yield 173 lb. of cleaned fibre, and 92 lb. of seed. A woman can dress about 4 lb. a day. In April, 1581, Captain Thompson presented a dressed sample of the fibre of the Dhuncha of Bengal, and a piece of rope made of it. This rope, he stated, had been used in various way for nearly two years, and from various reports upon it, he thought it likely to come into extensive use. Specimens of the fibre and rope were also sent to the Exhibition of 1851, and we have already given (see FIBRES) the result of the trial made with this rope in the Arsenal of Fort William, whence it appears that a three and a half inch rope of Dhunchee broke with not less than 75 cwt., though the Government Proof, required for such rope, was only 49 cwt. The price of the Dhunchee, in the interior, has long been about R. 1 8 per maund. The following are reports upon this fibre: "The Dhunchee is very suitable for ropes, and if it will take in tar, is of considerable value. It would probably fetch from £30 to £35 a ton, and after being introduced and known, perhaps £5 more." It was also valued by others at £35 in 1853. These fibres, in fact all the fibres from the East, would be much more valuable if properly scutched; and if scutching mills were sent out, these fibres could be brought in a greatly improved state to market.—*Royle Fib. Pl. p.* 293.

(7565) SESBANIA ÆGYPTIACA, the Egyptian species, found also in India, forms a small and very elegant tree; its wood is employed in making the best charcoal for gunpowder.—*Eng. Cyc.* This species of sesbania may be seen in culture for the sake of its leaves, which the Burmese use for poultices to promote suppuration. Owing to this characteristic they call the tree, water chief.—*Mason.*

(7566) SESBANIA CANNABINA, the Dhanchi of Bengal, is not found wild. It is cultivated on account of the fibres of its bark, which are coarse, but more durable than some other substitutes of hemp, especially when exposed to wet, and are therefore generally employed for the drag-ropes and other cordage about fishing-nets.—*Eng. Cyc.*

(7567) SETARIA, a genus of Grasses containing a few species cultivated as corn-grains in some countries. The genus is named from 'seta,' a bristle, on account of the bristly nature of the involucrum. The species are found in both the hot and temperate parts of the world. The genus nearly corresponds in character with *Panicum*, under which it is sometimes included, but it is also combined with *Pennisetum*. It is characterised by having the spikelets 2-flowered, supported by two or more bristles; the lower valve is the smallest; the lower flower is neuter or male, with the valves of the corolla coriaceous and indurated, awnless, the lower one embracing the other; petaloid scales very obtuse and subfalcate; germen emarginate; seed included within the persistent glumes. The species are found both in the hot and temperate parts of the world.

(7568) SETARIA GLAUCA. Glaucous Bristle Grass, has a panicle spiked, continuous; bristles of the involucre round, with erect teeth; outer glumella of the fruit conspicuously wavy, wrinkled transversely; lower floret triandrous with two glumellas. It is found in Hertfordshire and other parts of England. The first twospecies are found in America and India. *S. Germanica* and *S. Italica* are cultivated as articles of diet in Europe and India.—*Eng. Cyc.*

(7569) SETARIA ITALICA, ITALIAN PANICLE. Panicum Italicum. Lin.

Tennay, TAM.
Kang, GUZ.
Raulaw, DUK.
Cungnie, HINDOOIE.
Navanay, CAN.
Navaria, MAL.
Caraloo, TEL.
Dokhu, ARAB.
Tenna, HORT. MAL.
Arzun, PERS.
Prayingoo, SANS.

This grain is prized by the natives of India, who make cakes of it and also prepare it as porridge. For the purposes of pastry it is very little inferior to wheat, and when boiled with milk, forms a light and pleasant meal for invalids. This article grows in abundance in the southern parts of Europe, particularly in Portugal, where it is termed Milho Painco.—*Ainslie, page* 220.

(7570) SETARIA: *Species*. A species of setaria, which the Karens call "horsetail grass" is scattered all over the Tenasserim Provinces.—*Mason.*

(7571) SETARIA VERTICELLATA. Bristle-Grass, has a panicle spiked, lobed below; branches whorled; bristles of the involucre rough, with reversed teeth, outer glumella of the fruit nearly even; lower floret united with one glumella. It is found in cultivated fields in England. Also in India.

(7572) SETARIA VIRIDIS, Green Bristle-Grass, has a panicle spiked, continuous; bristles of the involucre rough, with erect teeth; outer glumella of the fruit nearly even; lower floret neuter, with one glumella. This species is also British and Indian.

(7573) SETHIA INDICA. *Erythroxyleæ*, Ill. 48. Roxb. c. 88.

Semboolinja marum. Thavadarum, TAM.

When fully grown, it is still a small tree, the fruit yields an oil, and the wood is esteemed as a substitute for sandal wood.—*M.E.J.R.* This, Dr Wight believes, is the *erythroxylon areolatum* of Ainslie, when largest it is still but a small tree, Ainslie states that the wood is so fragrant, that it is used in Mysore as a substitute for sandal wood.—*Wight.*

(7574) SEWING. The art of *Sewing* is now practised in India chiefly by men, who are Mahomedans. They form the class of tailors (durzees), who make the dresses of their Mahomedan brethren. One is usually kept in the service of most Europeans.—*Royle Arts &c. of India, page* 505

(7575) SEYCHELLE COCOA-NUT is the fruit of one of the Palms (*Lodoicea Sechellarum*), respecting which many fabulous accounts were formerly related, such as, that it was produced at the bottom of the sea, the nuts being only found thrown up on the coasts of the Maldive Islands. They were called Coco de Maldivia, or Coco de Salomon, by the early Portuguese navigators. Many marvellous medical virtues were ascribed to these nuts by the physicians of the age, both Asiatic and European, and they were consequently sold at a high price. At present they form only objects of curiosity, and are well known under the name of Double Cocoa-Nuts. The tree yielding them was first discovered by Barré, a French officer of engineers, in 1769, then described by Sonnerat, but for the first time accurately described by Labillardiere, 'Ann. Mus.' Paris, ix. p. 140, t. 13. A very full description and illustrative plates have been given by Dr. Hooker, in the 'Botanical Magazine,' N. S., Nos. iv., v, and vi., 1827; and a paper on the subject was read at the Royal Asiatic Society by a resident of the Seychelle Islands. To the inhabitants the tree is useful for its timber, which is hard externally, and employed in building their huts and for posts; the leaves and their footstalks are used for the roof, walls, and partitions, and for many other domestic purposes. The nuts weigh from 23 to 25 pounds each, and when fresh contain a white, transparent, and jelly-like substance, which is edible. The shells are employed in making vessels and dishes of various kinds, and the entire nuts form articles of commerce, as they are esteemed in other countries both for their fabled virtues and as curiosities.—*Eng. Cyc.* See LODOICEA, also SEA-COCOANUT.

(7576) SHADDOCK. A large species of Citrus, commonly cultivated in the East and West Indies, for the sake of the delicate, subacid, juicy pulp, with which they abound. When at their greatest size, they are called Pompoleons; the smallest, form the forbidden fruit of the English markets.—*Faulkner.*

(7577) SHAGREEN.

Chagrin, Fr.
Schagrin, Ger.
Schagrim, Rus.

A sort of hard grained leather, prepared in a peculiar manner from the skin of horses and other animals, and employed in the manufacture of small cases and boxes. The leather is prepared in Poland, Astracan in Russia, and various parts of the Levant.—*Faulkner. Shagreen* differs from leather in not being tanned or tawed. It bears some resemblance to parchment, but the grain or hair side is granulated or covered with small round rough specks. It is an oriental manufacture, and the method of preparing it was long kept secret. It is said to be prepared from the skins of horses, wild asses and camels, those portions being preferred which cover the chine. The fillets of skin are steeped in water until the hair is sufficiently loosened to be scraped off; the skins are then stretched upon a board, and are unhaired and fleshed with a knife. Each fillet is then stretched in a frame, as in the preparation of parchment, and is moistened from time to time and gradually distended. While still moist, the grain or hair side is sprinkled over with the seeds of a kind of *Chenopodium*; they are hard, of a shining black colour, and about the size of poppy seed. These seeds are forced into the surface of the skin by the pressure of the feet or by means of a simple press, a piece of felt or thick stuff being laid over the seeds. In this state the skin is left to dry in the shade, and when the seeds are shaken out by beating the skin, the surface of the latter is pitted with small hollows corresponding with the forms of the seeds. The skin is now stretched on an inclined plane, by attaching its upper end to hooks and fastening weights to its lower end, it is thinned off with a half-moon knife, care being taken not to cut so far as the bottom of the little pits occasioned by the seeds. On macerating the skins in water they swell, and they become prominent over the shaven surface. The process is completed by steeping the strips in a warm solution of soda; salt brine is then used, and the skins are ready for the dyer.—*Tomlinson.*

(7578) SHALE, a term applied to any argillaceous deposit naturally divisible into laminæ parallel to the plane of deposition. Thus there are *sandy*, *calcareous*, purely *argillaceous*, and *carbonaceous* shales; there is also a *black* and a *brown bituminous* shale;—*Tomlinson. Shales or fire Clays*, occur at Streepermatoor, Tripasoor, Chingleput, Mettapollium, and Cuddapah.

(7579) SHALLOT. ALLIUM ASCALONICUM.

Gundhund, HIND.

Propagated in the same way as the chive.—*Riddell.* Shallots are the mildest of the onion tribe, seeds seldom; propagated by the young bulbs, used in sauces, salads, &c.—*Jaffrey.*

(7580) SHA-NEE, a bast of Arracan, of a reddish brown colour, rough and coarse.

(7581) SHARK'S FINS.

Soora meen sepputtay, TAM.
Pauk, DUK. GUZ. and HIND.
Iyu or Yu, MALAY and JAVANESE.

Sharks are numerous, and of great size in the seas of the Eastern Archipelago, and their fins are a regular article of trade for the market of China, where they are prized for their real or imaginary stimulating and restorative qualities. The name for the shark in Malay and Javanese is Iyu, or, abbreviated, Yu, and this name has a very extensive currency, for it is even found in some dialects of the islands of the Pacific.—*Crawfurd Dict. page* 378.

Sharks fins are largely exported from Bombay and Madras to China, where they are much esteemed as a strengthening food. They are chiefly collected in the Persian and Arabian Gulfs, on the Coasts of Mekran and Malabar, and other places along the sea coasts.—*Faulkner.*

The Chinese fishmongers of the Straits Settlements, also, obtain Shark's fins from the same localities which supply them with Fish maws. These fins are not exclusively selected from Sharks (Squali,) but equally from (Raiæ). Quantities examined at Pinang were composed of Fins of the following Genera: *Stegostoma, Carcharias, Sphyrna, Pristis, Rhinobatus, Trygon, and Myliobatis.* Of all fishes Sharks and Rays are the most valuable to the Chinese. The flesh and entrails of all, not even the electric Rays (*Torpedinideæ*) excepted, are eaten either fresh or dried, the skin is used for polishing or converted into Shagreen; gelatine is obtained from the larger fins, glue from the smaller. All, except the caudal fins, are cut at the root so as to leave as little flesh as possible. The root is dipped in wetted lime (Chunam) in the erroneous belief of preventing attacks of insects, and then the fins are dried in the sun. Those imported in the Straits Settlements are packed promiscuously in gunny bags, each containing from one half to one Pikul. According to the value in the Chinese market, the fishmongers assort the fins in two kinds, "white" and "black" The *white* consist exclusively of the dorsal fins, which are on both sides of a uniform light colour and reputed to yield more gelatine than the other fins. In China, the lovers of gelatinous soups pay from 30 to 40 Spanish Dollars per Pikul of white fins. The pectoral, ventral and anal fins pass under the denomination of *black* fins. The colour, however, varies according to the species from buff to grey or brown, and most of them are of two different colours, the upper surface being dark, the lower light. The black fins, for obvious reasons the most numerous, are supposed to yield a comparatively small quantity of gelatine and sell in China from 15 to 20 Spanish Dollars per Pikul. Mr. W. T. Lewis has communicated the annexed table, shewing the quantity of Shark's fins imported into, and exported during 10 years from Penang to China. The total quantities of Shark's Fins imported into and exported from Prince of Wales Island, from 1832 to 1842, were

IMPORTS.			EXPORTS.		
1832—33 TO 1841—42	Quantity in Pikuls,	Value in Spanish Dollars	1832 33 TO 1841—42	Quantity in Pikuls.	Value in Spanish Dollars.
Total,...	1,350	19,216	Total,...	3 177	48,036

Cantor.

Shark's fins are sought for from the Indian ocean to the Sandwich islands to supply the Chinese market. The chief supply is from Bombay and the Persian Gulf. They are fat, cartilaginous, and when cooked, esteemed by the Chinese as a stimulant and tonic. They should be thoroughly dried and kept from any moisture. About five hundred pieces are contained in a pecul. The price is from $6 to $60 per pecul. There seems to be little or no choice as to what species of shark the fins are from, but those of a whitish color are valued much higher than the black sort. Sharks and rays of all kinds form a common article of food on the Chinese sea coast. The trade in shark's fins is likely to extend at the north —*Morrison.* Travancore sends Shark's Fins which is a favorite article of diet with the Chinese, and is largely exported.—*M. E. J. R.*

(7582) SHA-PHYOO, a bast of Arracan, long, thin, smooth layers, light-colored, tough and flexible.

(7583) SHAWLS.

Chals, Chales, FR.
Schalen, GER.
Shawl, GUZ. HIND.
Shavali, TR.
Shawl, PERS.
Chales, PORT.
Schavalos, SP.

Are well-known articles of dress, made of wool, silk, or more commonly of silk and wool mixed. The finest shawls are those made at Cashmere, which are largely exported from Bombay to London. The chief seats of the shawl manufacture in Britain are, Paisley and Norwich; the French shawls are, however, much more esteemed than the English.—*Faulkner.*

Although in many branches of textile manufacture, England has outstripped her oriental teacher, we still find among the workmen of the East, a degree of taste in the adjustment of their designs, an amount of skill applied to the getting-up of the fabric and the blending of patterns and colours so aptly combined, as to leave nothing to be desired, but rather to shew that what we are now arriving at in arts-design by the aid of scientific teachings, has been practised amongst that ancient race during the last thousand years. The correct principle which science has laid down in the schools of the West, that the patterns and colours of woven goods should diversify plain surfaces without disturbing the impression of flatness, has evidently been known to them from the earliest times. Nor is it in this alone that the workmen of the East excel: they are equally celebrated for the rich and varied beauty of their patterns, and the strict appropriateness of these to the colours employed. Foremost amongst the woven fabries of India are the world-famed shawls of Cashmere, the finest of which, in spite of many imitations in Europe, are still produced in the "Vale of Cashmere," whence continues to come the supply of the most valuable wool employed in the manufacture. The Cashmere goat thrives no where so well as amidst the grassy ravines and shady clefts of the Cashmerian hills; and from the neck and under part of the body of the animal is taken the fine, flossy, silk-like hair, which is worked up into these beautiful shawls with an exquisite taste and skill which all the mechanical ingenuity of Europe has never been able to imitate with more than partial success. Mention may be found of these shawls in the *Mahabharat* and other ancient works of the East. The people of the countries adjacent to Cashmere are there spoken of as bringing skins and cloths of wool embroidered with gold as tribute to the sovereign. From the *Ayeen Akberry*, written in the sixteenth century, we gather that the Emperor Akbar encouraged the manufacture of these shawls by every means in his power, even designing some himself, and introducing a greater and richer variety of colours in their patterns. The same work informs us of the extension of this manufacture to the state of Lahore, where it is said there were then a thousand manufactories employed on them. A mixture of wool and silk for turbans is also spoken of; and some space is occupied with an enumeration of the various qualities of the shawls and turbans, and the mode of classifying them for value. Since the above period, the many troubles and political changes in the position of country have materially affected this branch of industry; and we accordingly find that from 30,000 looms, which was at one time the number at work in Lahore, there were, some years since, but 16,000. Doubtless the more settled state of the country, and the increasing demand for the article in various parts of the world, will now help to revive this manufacture. In all eastern countries the shawl is ever considered the most essential and graceful part of ornamental dress; and even in Europe, with their many beautiful imitations, the true Cashmere shawl is still sought and paid for at enormous prices. Even in India it is by no means unusual for a rajah to pay ten thousand rupees (1000*l.*) for one of the finest of those productions; and which, in all probability, will have cost the labour of a whole family for a life-time. The annual value of these shawls imported into Great Britain does not exceed six or seven thousand pounds, and forms no sort of criterion as to the yearly produce of the Cashmerian looms, since by far the most valuable are taken by native kings and rajahs, and large quantities are also dispatched to Russia, Turkey, Greece, America, and continental Europe. Previous to the imitation of these goods at Paisley, the imports had amounted to as much as 16,000*l.* annually. In embroidered shawls, scarfs, handkerchiefs, &c., in silk, cotton, and mixed fabrics, India stands preemenent. Here also as in the make of Cashmere shawls, the Hindoos, by their skilful and delicate manipulation, are able to produce fabrics of such exquisite fineness, as to defy the more scientific labours of European nations. Their scarfs of brocaded gold and silver, laid upon red, white, and green grounds, and worked in and interspersed with beetle's wings, and other ornaments, are at once the wonder and admiration of the world.—*Capper's Three Presidencies.*

Bangalore Silk Shawls. At the Madras Exhibition of 1855, two Bangalore *Silk Bed Quilts* exhibited by Moonshee Nunjapah (CLXXIV 147) Dondala Esmursan (CLXXIV 158) were good specimens of this description of native manufacture, and the jury would have assigned a prize to the first as being the superior article of the two, had not both been priced so much above their real value as to prevent their being brought into general use.

A Bangalore Silk Shawl by Moonshee Nunjapah (CLXXIV 153) weighing 2 lbs. 3 oz. 5⅔ dr. price 125 Rs. was the best woven fabric of this description, and the jury awarded him a 2nd Class Medal.

(7584) SHAWL WOOL GOATS. In Thibet, there are two varieties ; one is a large animal, with great horns, called Rappoo ; the other smaller, and with slender horns, is called "Tilloo." The latter yields the finest wool, but they are mixed for ordinary purposes. Dr Hooker was assured that the sheep, of which large flocks were grazing near, afford the finest wool of any. The animals were caught by the tail, their legs tied, the long winter's hair pulled out, and the remainder cut away with a broad flat knife, which was sharpened with a scythe stone. The operation was clumsily performed, and the skin much cut.—*Hooker, Him. Jour. Vol.* II. *page* 88.

(7585) SHELL, The protective covering of a class of animals widely distributed throughout the earth, the fresh water, and the ocean. This covering is in most cases exterior, and large enough to enclose the whole body ; but in some cases it is interior, and only of sufficient size to protect the heart and lungs. Shell is a secretion from the skin which covers the back of the animal, and which is of a peculiar thickness and fleshy consistence, and is called the *mantle.* This fleshy mantle is very evident on the back of the common grey slug, in which it covers only a portion of the body, and contains in general, within the substance, an internal shell, small, flat, transparent, and oval. The snail affords a familiar instance of an external shell. Shells are called *univalve* or *bivalve* according as they consist of one part, or of two parts joined together by a hinge. The snail is univalve, the oyster is bivalve. Bivalves are inferior in the scale of existence to univalves, both as it respects powers of motion and organs of sense. The generality of the bivalve shells, including various oysters, muscles, &c., are termed *nacreous* shells, from *nacre,* the French for mother-of-pearl. Their structure and uses in the arts have been already treated of Molluscous animals were chiefly represented in the Exhibition of 1851, by the ingenious arrangement of their shelly coverings in the form of vases, baskets, &c. An elegant epergne was exhibited, composed entirely of shells gathered from the shores of the Bahamas, arranged as cornucopias filled with flowers, in great variety of colour and beauty. Also a large vase from the same islands with a group of flowers composed entirely of pure white shells. Shell bracelets from Dacca, with a half-moon saw, and complete set of apparatus used by the bracelet-makers, were curious. There were also interesting specimens of the conchology of Jersey, among which was the *Oreille de Mer,* a shell-fish abundantly found in that island, and used in a variety of ways for food, while the shell is preserved, and exported to England, where its pearly iridescence causes it to be valued in ornamental papier mache works. There were also vases and table-tops, from the Channel Islands, richly ornamented with wreaths of shells. The little island of Herm affords an immense collection of interesting shells, in which the greater part of the devices were executed. Bouquets in shell-work from the Mauritius, specimens from the Eastern Archipelago, and leaves, baskets and flowers, in the same material, from France, completed the large amount of shell-work displayed in the Exhibition. The so-called *Shell* of the tortoise, which is merely a bony covering, and different in structure from true shell, was displayed in its natural state, and in a variety of beautiful fancy articles, from Ceylon, the Eastern Archipelago, France, Trinidad, &c. The beautiful lining of oyster-shells, known as mother-of-pearl, was manufactured into articles of great beauty, while a profuse display of the pearls themselves, the produce of the pearl-oyster, or rather mussel, were very interesting to look upon, though they are, in fact, a proof of disease in the animal which secretes them. Pearls are produced when the transparent envelope of the animal, called the mantle, is wounded or irritated. There are small, boring worms, which pierce the shell and penetrate to the body of the animal. The mantle then sends forth a quantity of pearly matter over the wounded spot, and this becomes a little knob or pearl. Grains of sand, or other minute substances entering the shell, are in the same way coated over with pearly matter. *Tomlinson*, p. cxxix. It remains therefore to speak of the univalve shells, and their employment in the arts. Most of the univalve shells are of the character called *porcelanous* from their brittleness, translucence, and the resemblance of their fracture to that of porcelain. But this fracture when examined by the miscroscope reveals a structure of thick parallel layers, usually of a finely fibrous nature, at right angles to the external surface. Dr. Aikin says that these fibres are often nothing more than the transverse section of thin transparent parallel lamellæ, which when viewed on their broad surfaces often exhibit the usual natural joints of calcareous spar. The soluble part of these shells is carbonate of lime, the particles of which are cemented together with a very minute proportion of animal mucus. The hard and compact nature of such shells, and their generally smooth surface, prevent their being cut by the ordinary tools, which are available for the less hard and frangible nacreous shells: it is therefore necessary to treat them after the manner of the lapidary, with emery, rottenstone, and other substances harder than the shells themselves. Such shells generally require rather to be polished than cut, but where it is necessary to divide them in order to exhibit their sections, they are operated upon by means of the slicer with diamond powder. Certain descriptions of these shells are well adapted for cameo-cutting, on account of their substance being made up of differently coloured layers, and also on account of a difference of hardness and texture in the different layers, some approaching more nearly to the nature of nacreous than of porcelanous material. Specimens of cameo-shells, and of the rude but efficient instruments for cutting them, were shown in the Indian collection of the Great Exhibition. The shells were dense, thick, and consisted of three layers of differently coloured shell material. "In the *Cassia rufa* each layer is composed of many very thin plates, in other words is laminated, the laminæ, being perpendicular to the plane of the main layer: each lamina consists of a series of elongated prismatic cells, adherent by their long sides. The laminæ of the outer and inner layers are parallel to the lines of growth, while those of the middle layer are at right angles to them." Several varieties of the genus *Strombus* or conch, supply suitable shells for cameo cutting. The outer layer is nearly colourless, can be operated upon with steel tools, and may be carved into smooth and finished forms. Experience has taught the cameo-cutter to choose the kinds known as the *Bull's Mouth*, the *Black Helmet*, the *Horned Helmet*, and the *Queen Conch*, of which the first two are the best. The art of cameo cutting was confined to Rome for upwards of forty years, and to Italy until the last twenty-six years, at which time an Italian began cutting cameos in Paris, and now upwards of 300 persons are employed in the trade in that city. About thirty years ago, the total annual number of shells used in the trade was about 300: the whole of them were sent from England, and they were worth 30 shillings each in Rome. But so rapid was the progress of the manufacture when it became more widely diffused, that the following numbers were given a few years ago, (1847,) by Mr. Gray, as the consumption of shells in France for this purpose.

Bull's Mouth………	80.000	average price 1*s.* 8*d.*	value 6,400*l.*
Black Helmet………	8,000	……………… 5*s.* 0d.	….. 1,800*l.*
Horned Helmet………	500	…………… …. 2*s* 6*d*	… .. 60*l.*
Queen Conch ………	12,000	……… …… 1*s.* 2½*d.*	…… 700*l.*
	100,500 shells.		£8,960

The average value of the large cameos made in Paris, as stated by the same authority, is 6 francs each, giving a sterling value of 32,000*l.*, and the value of the small cameos is about 8,000*l.*, giving a total value of the cameos produced in Paris, in one year, (1846,) at 40,000l.; while at the same time in England, not more than six persons were employed at the trade. The Black Helmet, on account of the advantageous contrast of colour in the layers, produces very effective cameos, the carved figure of the white upper layer being strongly relieved by the dark, almost black ground, supplied by the second layer. The shell is first cut into pieces the size of the required cameos, by means of diamond dust and the slitting mill, or by a blade of iron or steel fed with emery and water. It is then carefully shaped into a square, oval or other shape on the grindstone, and the edges are finished with oilstone. It is next cemented to a block of wood, which serves as a handle to be grasped by the artist while tracing out with a pencil the figure to be cut on the shell. The pencil mark is followed by a sharp point, which scratches the desired outline, and this again by delicate tools of steel wire flattened at the end and hardened, and by files and gravers, for the removal of the superfluous portions of the white enamel. A common darning-needle, fixed in a wooden handle, forms a useful tool in this very minute and delicate species of carving. The careful manipulation necessary in this work can only be acquired by experience, but there are general rules thus sensibly given which the learner would do well to remember:—"As in all other processes of producing form by reduction, the general shape should be first wrought, with care to leave every projection rather in excess, to be gradually reduced as the details and finish of the work are approached. To render the high parts more distinct during the process of carving, it will be found convenient to mark them slightly with black-lead pencil. Throughout the cutting, great caution should be observed, that in removing the white thickness the dark ground is not damaged, as the natural surface of the dark layer is far superior to any that can be given artificially; indeed, should the ground be broken up at one part, it would be requisite from its lamellar structure to remove the entire scale or lamina from the whole surface, a process that will be found very tedious, and much more difficult than the separation of the white from the black thickness. In order that the finished cameo may possess a distinct outline at all points of view, it is desirable to adopt the system followed in antique cameos, namely to leave all the edges of the figure quite square from the ground, and not gradually rounded down to the dark surface; should this latter method be followed, it will be found that the outline is in many place undefined owing to the colour of the white raised figure of the cameo gradually emerging into that of the dark ground: this evil is entirely avoided by leaving the edge of the figure quite square, for the thickness of about $\frac{1}{50}$th of an inch. The surface of the cameo should be finished as nearly as possible with the cutting tools, as all polishing with abrasive powders is liable to remove the sharp angles of the figures, and deteriorate the cameo by leaving the form undefined. When, however, the work has been finished as smooth as possible with the cutting tools, the final polish may be given by a little putty-powder used dry, upon a moderately stiff tooth-brush, applied with care, and rather to the dark ground than to the carved surface; this is the concluding process, after which the cameo is ready for removing from the black prior to mounting." The covering of the tortoise does not properly come under the denomination *shell*, partaking as it does of the nature of *horn*.—*Tomlinson*. *Shell* then is the hard calcareous substance, which protects either partially or entirely the Testaceous Molluscs externally, or supports certain of them internally. This substance, when external, may be considered as the exo-skeleton of the animal; when internal, as its endo-skeleton. What is called the Nacre in shell, and which is more especially observed in their interior, and which is distinguished by the iridescence produced by the action of light, is found to consist of layers or folds of membranous shell-substance. When examined under the microscope, this substance exhibits a series of layers, and it has been supposed that these are alternately layers of membranous and calcareous matter; but Dr. Carpenter has shown that when these layers are decalcified they exhibit the iridescence, but that when the corrugations are removed by stretching, the membrane no longer exhibits its beautiful hues. The Pearls found in the interior of the shell of many species of *Mollusca* seem to result from the deposit of the nacreous substance around some nucleus mostly of foreign origin. They are probably always formed between the mantle and the shell, although sometimes found in the muscles or viscera of the animal. The *Avicula margaritifera* is called the Pearl Oyster, on account of the frequency with which pearls are found in its interior. Pearls are not unfrequently found in the common oyster, and most fishmongers possess specimens which they have obtained from oysters they have opened. Many of the fresh-water *Conchifera* of European rivers contain them. The *Unio margaritiferus* yields them. It is said that the reputation of British pearls excited the cupidity of Julius Cæsar, and that he presented a buckler covered with them to Venus Genetrix, which was suspended in her temple. Pliny speaks of British pearls disparagingly. Those obtained from the *Unio* are generally very good; but many are procured from the *Mytilus edulis*, and these are not so valuable. (Forbes and Hanely, 'British Mollusca.') —*Eng. Cyc.*

(7586) SHELLAC.
Chupta-Lac, DUK. GUZ. & HIND.

The most common form in which lac is generally known, is the substance liquified, strained, and formed into thin transparent laminæ.—*Faulkner*. See LAC.

(7587) SHERBET. A favourite, cooling, and refreshing beverage used in the East; and made of the juice of limes, pomegranates, pine-apples, and other fruit, mixed with water and sugar, with the addition of rose-water, or some other fragrant ingredient. The Persian sherbets are most esteemed.—*Faulkner*.

(7588) SHERRY. A well known wine, of a deep or light amber colour. When good, it has a fine aromatic odour; its taste is warm, with some degree of the agreeable bitterness of the peach kernel. It is principally produced in the vicinity of Xeres in Spain. It is extensively used as a dinner wine.—*Faulkner*.

(7589) SHIELDS.

Daraq, ARABIC.
Dhal HIND.
——, TAM.
——, TEL.
Siphar, PERS.

The use of the *Shield* or *Buckler* seems to have been universal over the Malay and Philippine Archipelagos before the introduction of fire-arms, and is still continued by all the ruder tribes. In Malay there are no fewer than seven different names for it, four of which are native, —two taken from the Javanese, and one from the Telugu. These names, however, refer to the different forms of it, rather than constitute synonyms.—*Crawfurd Dict. p.* 379

(7590) SHIMBEAMS, in Madras, are planks 20-to 30 feet long; $\frac{1}{4}$-to 2-feet in breadth, and from 4-to 8-inches thick.

(7591) SHOES.

Schoenen, Dut,
Sonlies, Fr.
Schuhe, Ger.
Joora, Guz.
Jootie, Hind.

Baschmaki, Rus.
Zapatos, Sp.
Cheroopoo also chupatoo, Tam.
Chuppoo, Tel.

Are articles of covering for the feet, generally made of leather, and too well-known to need any description.—*Faulkner*. The Shoes, or rather slippers worn by the natives of Southern India, are generally of red leather if for men: they are made for the Madras market at Trichinopoly or Arcot, the patterns are called Appashahee; Chanddooroo; Chuppul; and Nok-dar: The rich natives use a buff coloured cloth. The slippers of females are ornamented with spangles. Their price is from 4 annas to a rupee.—*Herklots*. Thunberg says the shoes of Japan are always the shabbiest part of the dress of the Japanese. As they are of straw, they consequently last but a little time. But they are made in immense numbers, cost but a trifle, and may be bought in every town and village in the Empire. The pedestrian, therefore, throws away the old pair by the road side, and buys new ones as he goes along; while the more provident man takes two or three pairs with him on starting. Immense numbers of those discarded shoes may be found on the sides of all the roads. In wet weather they wear under the shoe a wooden clog, which is attached to the foot by ties of plaited straw. Dignitaries sometimes wear slippers made of fine rattan slips neatly plaited.—*American Expedition to Japan*, p. 65.

(7592) SHOLA or SOLA. This root is made into toys, artificial flowers, birds, garlands, floats for nets, or for bundles for crossing rivers. When charred it answers for tinder.

(7593) SHOREA, a small Indian genus of Plants, belonging to the natural order *Dipterocarpaceæ*, named in compliment to Sir J. Shore, afterwards Lord Teignmouth, then Governor-General of India. The genus is found as far south as the line; and *S. robusta*, the best known and most useful species, as far north as 30 N. lat in many parts forming the forest which skirt the south-western base of the Himalaya Mountains. The genus is characterised by having a calyx of 5 sepals enlarging into 5 long wings; petals 5; stamens 25 to 30; fruit 1-celled, 3 valved, and 1-seeded. The family to which the *Shorea* belongs is remarkable for the number of useful products yielded by its different species, as the camphor of Sumatra, resin, wood-oil, and valuable timber. *S. robusta* is remarkable on all these accounts, as it is a lofty and ornamental tree with showy inflorescence. It is well known as a timber-tree by the name of 'Saul,' or 'Sal', and chiefly employed in the northwestern province of India in all government works, house-timbers, gun-carriages, &c. The wood is of a uniform light-brown colour, close grained and strong. The tree exudes a resin which by the natives is called 'ral', and by the Europeans one of the kinds of Dammer, being used for the same purposes as any other resins, and in Bengal very frequently as a substitute for pitch in the dockyards. It is also sometimes used by the Hindoos as an incense.—*Eng. Cyc.*

(7594) SHOREA: *Species*. Doubtful Shorea. The largest tree in the Tenasserim Provinces of the wood oil tree family, yields no oil, and is probably a species of shorea; but, says Mr. Mason, have never seen it either in flower or fruit. It is principally used for making large boats, but its places of growth are usually of difficult access by water, and it is not in very general use. Mr. O'Riley says: "It is well adapted for spars for vessels."—*Mason*.

(7595) SHOREA ROBUSTA, Saul Tree. Roxb.

Uswukunida, Sans.
Eing-gyeen, Burm.

Saj, Arab.
Saul, Hind.

Shorea robusta or Saul tree, is of great size, a native of Morung, the Paulghant mountains &c. Sepals afterwards changing into 5 long wings, petals 5, stamens 15, filaments capillary, below the anthers, anther cells short, obtuse, connectum filiform, produce beyond the cells into a more or less elongated colored, deciduous bristle, ovarium 3 celled, with two pendulous ovules in each cell. Seed solitary, cotyledons stalked, not crumbled, radicle superior, leaves coriaceous, oblong, obtuse, often emarginate at the base, panicles numerous from the axils of the fallen leaves, branches and pedicles glabrous. The *Shorea robusta*, and indeed some other species, yield abundance of the resin called dammer, the superior kinds of which are efficient substitutes for the pine resin of the European Pharmacopœiæ. Captain Jenkins of Assam forwarded specimens of resin perfectly transparent and colorless; in the bazars the color ranges from pale amber to dark brown. It is devoid of taste and smell. Sp. gr. 1·097 to 1·123, easily fusible, partially soluble in alcohol (83 1 per 1000) almost entirely in either, perfectly in oil of turpentine and the fixed oils; sulphuric acid dissolves and gives it a red color. Two parts of colorless dammer and 2½ parts of oil of turpentine, make the best varnish for lithographic drawings. The dammer of the Northern Circars is chiefly produced by the varieties of the genus Shorea. The *Shoreas* are also found growing to a very limited extent on the Western coast, but do not appear to produce much, if indeed any. of the resin collected for sale. Saul is the Hindoostanic name of the very valuable wood of this tree, and is commonly employed for the beams and inside planks of ships.—*Ains. Mat. Med. p.* 210. Sal grows in a thick forest on Paras nath, in Behar.—*Hooker*, *page* 21. The Burman books say that Gaudama died in a grove of engyen trees; and the Pali name of engyen is *thala*, the Sanscrit sal, the name of the *Shorea robusta*. It not improbably exists in the Tenasserim Provinces, but the trees of the dipterocarpus tribe are so large that, to use the language of Griffith, "the flowers are frequently inaccessible." On one of the islands near Mergui, Mason found an enormous tree, whose dry fruit, with the calyx enlarged into five long wings, proved that it was at least a species of shorea, and on the Karen mountains he gathered a similar fruit. The natives say that a part of the petrified wood found in the valley of the Irrawaddy belongs to this tree, and the Burman books that Gaudama was born under one of them; although the savans state that he was born under a Jonesia. *Shorea robusta* according to Captain Munro "is probably the best timber tree in India," and every species of the natural family that produces it, affords valuable timber.—*Mason.* In Pegu, *Shorea robusta* is found chiefly on the Shan side of the Toungboo district, and in the Forests north of Tounghoo.—(McClelland's Light-brown wood) Dammer unites with the oxide of lead and forms plasters. Two parts of colourless dammer and 2½ of oil of turpentine make the best varnish for lithographic drawings —*O Shaughnessy, page.* 221. The dammer that exudes from the cuts in the trunk of the black dammer tree (Canarium) of the Malabar coast, seems to be a great favourite of several species of insects especially of one resembling a bee, called by the Hillmen "Kulliada" (*earth hole*) which live in pairs in holes in the ground. This curious circumstance will doubtless account for the mode of formation of the resin called in Burmah, Poon-yet and Pocy ne-yet specimens of which were exhibited at the Madras Exhibition of 1857, and are said to be found in the ground and supposed to be produced by some hymenopterous insect, it is also found in hollow trees. This substance although composed chiefly of a yellow brittle resin mixed with more or less sand or earth has an appearance precisely like that which would be looked for if used by an hymenopterous insect in the construction of its cells (See classified Catalogue of the Madras Exhibition of 1857, Class iv.) The Madras Exhibition of 1855, contained a substance from Malacca called "*Dammer klootee*" which had been evidently formed in the same manner, although the cells were longer and the resin black and harder than the Poon yet. Specimens of this curious substance *Poon-yet,* were exhibited by Dr. Cleghorn and the Honorable W. Elliot, Esq. They were brought from Burmah and are said to be produced by a species of Hymenopterous insect in holes in the ground and hollow trees. Indeed the cellular structure of the specimens much resemble that of a wasp's nest. In the course of the Jury's investigations of the origin of the dammers of the western coast, it was incidentally mentioned that a species of bee appeared exceedingly fond of the liquid dammer of the Canarium, this insect lives in holes in the ground and it will probably be found on inspection that its cells are composed of a similar substance to that now under consideration. —*M.E.J.R. of* 1857. Pwai-ngyet, *Burmese*, is given by Dr. McClelland as the Burmese name of the Resin of this Shorea.—*McClelland, p.* 141.

(7596) SHOREA (VATICA,) *Species.* LARD SHOREA. On the mountains in the interior of Tenasserim is a species of shorea which produces an oil of the consistence of lard, and has been hence named by the Karens "the hog's lard tree." The books say that the shoreas produce resin, and dipterocarpus oil, but the fine long scarious wings of the dried calyx afford incontrovertible evidence that it is a species of shorea.—*Mason.*

(7597) SHRUB ('Frutex'). All plants are divided into herbs, shrubs, and trees. A shrub is a plant with a woody stem, which approaches the tree in its duration and consistence, but never attains the height of a tree, and is generally taller than the herb. It varies in height from about four to twelve feet. Linnæus attempted to distinguish trees from shrubs by the former having buds and the latter having none. But this distinction is of no avail, as plants like the willow, generally called shrubs, passes buds, whilst most trees in hot countries are without them. In horticulture, shrubs are two well known to need a definition. For practical purposes they are divided into the deciduous and evergreen kinds, and each of these kinds may be further divided according to their hardy or tender habits, their form, size, mode of growth, colour, &c. The most ornamental flowering shrubs are those belonging to the genera *Rosa*, *Rhododendron*, *Azalea*, *Kalmia*, *Andromeda*, *Vaccinium*, &c. Among the evergreen shurbs are the Holly, the Ivy, the Jasmine, the Box, various Heaths, &c. Shrubs are often planted together, forming what are called shrubberries, and when the kinds are judiciously selected and arranged, these collections add greatly to the beauty of the gardens and pleasure-ground where they are introduced.—*Eng. Cyc.*

At the Madras Exhibition of 1855, a few shells were exhibited, belonging to the genera, *Haliotis*, *turbo*, &c., useful in connection with the manufacture of mother of pearl buttons, likewise the *Chanks*, which the Hindoos use in their processions, the exportation of these is very great, chiefly to Calcutta.—*M. E. J. R.* The inland waters of China produce many species of shells, and the new genus Theliderma allied to the Unio, was formed by Mr. Benson of Calcutta, from specimens obtained of a shopkeeper at Canton. The land shells are abundant especially various kinds of snails, and are not altogether unknown as articles of food. A catalogue of nearly sixty shells obtained in Canton, is given in Murray's China (v. iii p. 445), but it is doubtful whether more than a majority of them are found in the country as the shops at Canton are supplied in a great degree from the Indian Archipelago. Shells are common along the coast; Dr. Cantor mentions eighty-eight genera occurring between Canton and Chusan.—*Williams, page* 272.

(7598) SHULGUM. BRASSICA RAPA. Turnip.

(7599) SHUMAC OR SUMACH. Sometimes called young fustic, is the powder of the leaves, peduncles, and young branches of a small deciduous plant (Rhus coriaria) native of the South of Europe, but which is also grown in Syria and Palestine, for its powerful astringent properties, which renders it valuable for tanning light colored leather, and it imparts a beautiful bright yellow dye to cottons, which is rendered permanent by proper mordants. It is principally imported from the Ionian Islands and the Morea. The species grown for the purpose in Spain, Portugal, and Italy is R. Cotinus, a shrub with pale purple flowers, whereas R. Coriaria has greenish yellow blossoms. They may be propagated by cuttings of the roots and layers. R. typhina and R. Glabra with their varieties, are North American species, which are also used for tanning purposes. In Montpellier and the South of France the twigs and leaves are known under the name of redoul or roudo. They are gathered every year, and the shoots are chipped or reduced to powder by a mill. The imports into the United Kingdom were in 1846, 10,256 tons; in 1847, 11,975 tons; in 1848, 9,617 tons; in 1849, 12,590 tons; in 1850, 12,929 tons and in 1852, 9,758; which were all retained for consumption. In 1841, we received about 9,000 tons from the port of Leghorn. There were exported from Sicily in 1842, 123,305 tons, valued at £68,894. It is imported in packages of about a cwt., wrapped in cloth. America takes a large quantity of Sumach. The imports into the port of Boston alone, were 19,070 bags in 1847, 34,524 in 1848 and 30,050 in 1849. The prices in Liverpool duty paid in the close of this year, are per cwt.

	s.	d.		s.	d.
Messina, ...	10	... 0	to	10	... 6
Palermo,.......... ...	12	... 0	,,	13	... 0
Trieste,..	7	... 0	,,	7	... 6
Verona.	5	... 6	,,	6	... 6
Tyrolese...............	8	... 0	,,	9	... 0

Simmonds.

The trees producing Shumac, are,

Rhus Coriaria, Hide or Elm-Leaved Sumach.

Shumuk, PERS. | Tumtum, ARAB.

A native of Persia, Syria, Palestine, and the south of Europe, about 8 or 10 feet high, divided into numerous irregular branches. All parts of this plant are inodorous, but have a styptic taste; to the abundance of tannic acid it owes its properties and value in the arts: M. Tromsdorf has found in the berries a large quantity of bi-malate of lime.—O' *Shaughnessy, page* 282. Leaf 5-7 pairs of villous leaflets, elliptical, bluntly and coarsely toothed, petioles naked. Flowers in large loose panicles of a whitish-green. Drupes villous. This plant is extensively used for the purpose of tanning, and it is said that all the leather made in Turkey is tanned with the bark of this species of *Rhus*. The fruit is acid and astringent, and the seeds are often used as tonic for exciting the appetite.

Rhus continus, Venus-Sumach, or Wild Olive. Flowers hermaphrodite, arranged in loose panicles of a greenish-yellow colour: leaves simple, entire. This a very ornamental shrub, and is one of the European species, growing wild in various districts of the south of Europe. It is made use of, like many other of the species, for tanning, in Italy, and is called Scotino. The wood is used by the modern Greeks for dyeing wool, which is said to be of a beautiful rich yellow. It is frequently cultivated on account of its beauty.

Rhus glabra, Smooth Leaved Sumach. Leaf like the last, but broader and glabrous. Branches also glabrous. Fruit red, covered with silky hairs. This species, as well as another named *R. viridifolia*, is considered by some botanists as only a variety of *R typhina*, Like the last, this species is abundant in North America, over-running sometimes a whole district, and forming a troublesome weed. Its fruit is very sour, but may be eaten with impunity. Bees are very fond of the blossoms.

Rhus typhina, Fever-Rhus, or Stag's-Horn Sumach. Leaves with 8-10 pair of leaflets and an odd one, lanceolate-acuminate, serrated, pilose beneath. There are two forms of this plant; the one *R. t. arborescens*, in the form of a tree, from 10 to 25 feet in height; the other *R. t. frutescens*, shrubby, and only from 2 to 10 feet high. The young shoots are covered with down, which, with their somewhat crooked and stunted branches, give them the appearance of young stags'-horns: hence their name. The flowers are in dense spikes, at the ends of the branches, the pistilliferous ones developing themselves into woolly drupes, which are very conspicuous when ripe. It is found in every part of North America, and its dark-red leaves add much to the beauties of an American autumn. The fruit of this plant is exceedingly sour, and on this account it is frequently called vinegar plant, and is even used in some parts as a substitute for vinegar.

(7600) SIAMULIUM. A troublesome, dipterous insect (the "Peepsa," a species of *Siamulium*) swarms on the banks of the streams uniting with the little Rungeet river in Sikkim. It is very small and black, floating like a speck before the eye; its bite leaves a spot of extravastated blood under the cuticle, very irritating if not opened.—*Hooker Him Jour. Vol.*I. *p.* 157.

(7601) SIBIA GLOMERATA.

Thit-phyew, BURM.

Very plentiful in Prome, Pegu and Toonghoo, as well as about Donabew; a compact and close-grained wood, seven or eight feet in girth, and is a timber that deserves to be attended to with a view of bringing it into use. Wood, white colored, adapted for fancy work and cabinet making.—*McClelland.*

(7602) SIDA, a genus af Plants belonging to the natural order *Malvaceæ*, containing nearly 200 species, which are very extensively distributed throughout the warm parts of the world, and abound in the peninsula and plains of India. The name was originally applied by Theophrastus to a plant growing in moist situations, which is believed to have been an *Althæa*, also belonging to the family of *Malvaceæ*, and was adopted by Linnæus for this genus.

Sida is characterised by having a naked quinquifid calyx with valvate segments, Corolla with 5 petals, which are obovate, with the claws often united into a tube, and joined to the bottom of the stamen tube. The stamens numerous, with their filaments connected into a columnar tube at their base, and free at the apex, bearing the reniform anthers. The styles are numerous, but more or less united at the base. Capsule 5-or many-celled, Cocci single-seeded; seeds suspended, roundish, and flattened. The species of this genus vary much in habit, as well as in the structure of their fruit and seeds, but they resemble each other, as indeed do all Malvaceous plants, in abounding in mucilage, and in some of them having tough ligneous fibres, which are employed for the purposes of cordage in different countries. From their mucilaginous nature several are employed as demulcents in India, such as *Sida Indica*, *S. Asiatica*, and *S. populifolia*, in the same way that the Mallow and the Marsh-Mallow are in Europe. The leaves of *S. carpinifolia* (a native of Brazil and the Canary Islands) are chewed by the Brazilians, and applied with success to the stings of wasps and bees. *S. rhomboidea* and *S. rhombifolia* abound in very delicate flax-like fibres, which may be used for many of the same purposes as hemp and flax; but when the plants are grown for the sake of their fibres, they ought to be sown thick, under which circumstances, like other plants similarly sown, they grow tall and slender without branches. So *S. periplocifolia*, a native of the Malay Islands, which succeeds well in India, may be cultivated for the same object, especially as when cut near the earth it quickly shoots into long simple twigs which abound in flax-like fibres. A species, *S. tiliæfolia*, is actually cultivated for this purpose in China. Seeds of this species were received at the Calcutta Botanic Garden under the name of King-ma from Pekin, in the neighbourhood of which the plant was said to be cultivated as a substitute for hemp and flax. At Rio Janeiro the straight shoots of *S. macrantha* are employed as rocket-sticks.—*Eng. Cyc.* Wight gives Sida acuta, 95; *Indica*, 12; and *populifolia*, 12.

(7603) SIDA ACUTA, Asiatica, indica, graveolens, &c. are malvaceous plants common in every part of India many of them containing fibres which might be turned to useful account.

(7604) SIDA HEMP OR FLAX OF BURMAH is the product of two species, Sida acuta and Sida stipulata, (Burmese, Pyen-dan-gna-len.) They are mere weeds, but the most troublesome, in Tavoy.—*Mason.*

(7605) SIDA LANCEOLATA, RETZ.

Sida acuta, BURM. | Kureta, DUK.
Pata, SANS.

A common plant, grows wild in many parts of the Deccan; flowers small, yellow, grows to the height of about three feet; and no doubt, like the S. Rhomboidea, a good fibre might be procured from it.—*Riddell* It is a native of the peninsula of India, and found also in the hilly districts. The root resembles common liquorice and is very bitter. Dr. Ainslie informs us that the infusion of this root combined with ginger is given in intermittents and in chronic diarrhœa. The leaves bruised with oil are applied externally as a poultice to accelerate suppuration. Dr. O'Shaughnessy used an infusion of the root with some advantage in the cases alluded to by Ainslie, but could not satisfy himself as to its febrifuge action. It promotes perspiration, increases the appetite, and is in many respects a useful substitute for more costly bitters. An electuary is prepared, in Bengal, from the expressed juice of the *Sida* and used in the treatment of worms in the intestinal canal, but experienced native practitioners say that no reliance can be placed on its efficacy. Care must be taken not to confound the classical name of this plant with the *Sidhee* of the bazar, which is a mixture of the dried leaves and young capsules of the Indian hemp, and a powerful narcotic.—*O' Shaughnessy, p.* 214. An infusion of pata root is a very useful bitter tonic and astringent. Dose, one to two ounces three times daily. Pata is also the name of Corchorus olitorious.—*Beng. Phar. p.* 304.

(7606) SIDA LANCEOLATA. THE LANCE LEAVED SIDA.

The root.

Malaytanghie vayr, TAM. | Vishabaddee, TEL.

This root, which is not unlike the common Liquorice root, in appearance, is intensely bitter and is prescribed in infusion together with Ginger in cases of Intermittent Fever, it is also considered as a stomachic, and is a useful remedy in chronic Bowel affections.—*Ains. Mat. Med. page* 87.

(7607) SIDA PERIPLOCIFOLIA, a native of the Malay Islands, was also one of those subjected to experiment by Dr. Roxburgh, who describes the plant as flowering and ripening its seed in the Botanic Garden at Calcutta, a great part of the year. "Its bark abounds in serviceable flaxen fibres, and as it shoots quickly into long, simple twigs, particularly if cut near the earth, it answers well for procuring the fibre of good length for most purposes." Various species of Sida, as *S. asiatica*, *indica*, *graveolens*, and others, are extremely common in every part of India in the rainy season. Many of them, no doubt, contain fibre which might be turned to useful account.—*Royle Fib. Plants, page* 263.

(7608) SIDA RHOMBOIDEA AND SIDA RHOMBIFOLIA are the *sufed* and *lal bariala* of the natives of Bengal, where the plants are indigenous in the rainy season. The bark of both, according to Dr. Roxburgh, yields abundance of very delicate flaxy fibres, which he thought might be advantageously employed for many purposes. When the seed is sown thick on a good soil, the plants grow fall and slender, without branches, and are every way fit for such purposes.—*Royle.* Major Hanney sent from Assam to the Agri-Hortic. Soc., in Dec., 1851, some of the fibre of *Sida of rhomboidea*, which grows luxuriantly in that valley. Capt. Thompson thought from its length, its similarity to silk, and its great strength, that it would fetch a high price in England. The line (only half an inch in circumference) sustained, after exposure to wet and sun for ten days, 400 lb.

(7609) SIDA STIPULATA. SIDA HEMP. The most troublesome weed in Tavoy produces a very fine hemp or flax. There are two species *Sida acuta* and *Sida stipulata*, but they are not usually distinguished.—*Mason.*

(7610) SIDA TILIÆFOLIA. This species, *S. tiliæfolia*, referred at first by Dr. Roxburgh to *S. abutilon*, is cultivated for the purpose of its fibres in China. Some of its seeds were received many years ago at the Calcutta Botanic Garden, under the name of *King-ma*, from Pekin, in the neighbourhood of which the plant is cultivated, for the sake of its fibre. Seeds were similarly received a few years ago by the Horticultural Society, and Dr. Royle saw a fine crop of the plants in the garden at Chiswick, which seemed about eight feet high. Some of these Dr. Lindley had steeped, in order to separate the fibres, and some were sent to Mr. Routledge in the year 1850, in order to try in his machine. Dr. Roxburgh notices "the fibre of this plant as strong and pliable, very silky in its nature, and the plant of very rapid and luxuriant growth, three crops being obtained in one year. It may be brought into England at the estimated price of £8 per ton, which is about one fifth of the price of Hemp of the best quality." Some of Dr. Roxburgh's original specimens, marked July, 1804, are still in the India House; the fibres are from four to five feet in length, and display a fine soft and silky fibre, as well as adapted for spinning as the Jute, but are apparently superior.

(7611) SIDEROXYLON (from *σιδηρος* and *ξυλον*), a genus of Plants belonging to the natural order *Sapotaceæ.* The species of this genu are natives of Africa, America, the East Indies and Australia. They are evergreen trees, with axillary and lateral fascicles of flowers. They are remarkable for the hardness and weight of their wood, which sinks in water, and the genu has hence derived the name of Iron-wood. The *S. incime* (Smooth Iron-Wood) is a native of the Cape of Good Hope, and has long been cultivated in the greenhouses of Europe. None of th species however, are at all remarkable for beauty.—*Eng. Cyc.*

(7612) SIKAKUL. Root like a carrot brought from Cashmeer; used in Ajmere as an aphrodisiac.—*Gen. Med. Top. p.* 150.

(7613) SILIGOREE, Dr. Hooker here noticed a wild hog, the first wild beast of any size he had seen in the plains, except the hispid hare (*Lepus hispidus*) and the barking deer (*Stylocerus ratna.*) The hare he found to be the best game of this part of India, except the teal.—*Hooker Him. Jour. Vol* I. *page* 369.

(7614) SILLARUS, STORAX LIQUID.

(7615) SILENE COMPACTA. SILENACEÆ. Catch Fly.—These are elegant flowering plants of easy culture from seed, the flowers are of various colours, and require only the same treatment as the other species of Lychnis.—*Riddell.*

(7616) SILK.

Zyde, DUT.
Soie, FR.
Seide, GER.
Resum, Reshum, GUZ. and HIND.

Seta IT.
Ab reshum, PERS.
Seda, PORT. & SP.
Schelk, RUS.

A soft shining filament, the product of several species of caterpillar, particularly the *Bombyx mori* or silk worm. Silk occurs in various forms. *Cocoons*, *knibs* or *husks*, are the balls as formed by the worm, about the size of a pigeon's egg, and of a golden yellow colour. *Raw silk*, the state when simply wound off the cocoons into skeins or hanks, is the thread composed of several fibres united by their natural gum. *Waste silk*, is that part which is first wound off the cocoons in the operation of reeling, and such cocoons as being eaten through by the worm, cannot be wound off the reel, but are afterward carded and spun. Silk husbandry is extensively prosecuted in Italy, France, China, Persia, Siam, and India. The descriptions of raw silks met with in the Bombay markets are China, Persian, Siam, and Bengal.—*Faulkner.* The Bombyx Huttoni has lately been brought to notice by Captain Hutton as producing a new variety of silk, spinning in all weathers, whereas the common silk worm is apt to be thrown off work by a passing cloud. It is thought that the new worm may prove commercially important.—*Friend of India.* A new process is announced of manufacturing silk directly from the bark of the Mulberry tree. The inventor's name is Signor Lotteri. The Exports from Madras, of silk, has reached 1666lbs.

value Rs. 6,569, and it is probable that the culture may be successfully carried on in the valleys of Neilgherries. Indeed, for some years ast, experiments had been energetically carried on by the late Mr. Casamajor, and at present by Major Minchin: specimens of silk from Italian worms reared at Katy have been sent.—*M.E.J.R.*

Mysore.—The manufactured Silks sent to the Madras Exhibition of 1855, represented in very partial degree the resources of the ountry in this useful as well as ornamental ranch of Industry. The finest specimens of Madras silk manufacture, namely, the Shawls f Bangalore and the silk carpets of Tanjore nd elsewhere very deservedly were awarded Medals. The Bangalore Shawls were very reditable from the harmony of colors and legance of design. They have been much improved of late years both in quality of material nd in beauty of pattern; white silk pocket andkerchiefs rivalling the China silk in softness nd richness are also manufactured at Bangalore. he rearing of silk worms is carried on in all arts of the Mysore country, and great improvement has taken place in the quality of the silk t Bangalore, owing to the establishment, under he Mysore Government, of a farm, where mulerry trees from China and other countries have een introduced and where great attention has een paid to feeding the worms, &c. Still the ate of the trade compared with that of the engal Presidency shows that much is yet to e done, in 1841, 1,175,308 lbs. of raw and aste silk were exported from the East Indies nd Ceylon, of which nearly the whole was from engal. The exports from the Madras Presideny were, in 1853-4, 10,478 lbs. of raw silk and 688 pieces of piece goods. In addition to the xports of this material, a great quantity is used the manufactures of this country. The native oths owe their beauty in a great degree to the chness of the silk borders. The satins, kinobs, &c. of Hyderabad are well adapted to Nave costume, but hitherto little progress has een made in manufacturing articles for Euroean costume, except in Bangalore. The silk f Tanjore and the lesser but elegant articles ch as gimp, fringe, cords and tassels, braid r carriages, &c., are of every variety and great excellence.—*M. E. J. R.*

Bengal.—Dr. Royle, writing on the silk culre in India, mentions that the Silk-worms hich yielded the investments of Silk, were 1st. he large *Annual Worm* reared once in the ear, and yielding its produce from only the iddle of March till May. 2d. The *Dessecy*, r *Indigenous Silk-worm* of Bengal, of which e cocoons are obtained throughout the year; at is, there are four or five collections annully; of these, the worm of the cold weaer, or November breeds, and that of the dry eather, or March and April breeds, are superior to the others, from the more nourishing nature of the leaves at those seasons. 3d. The *China Silk worms* introduced into Bengal, which are next in estimation to the annual and country breeds; of these, both the yellow and white cocoons are abundant in the Radnagore district.

The Residents also described firstly, the *Nistry* tribe of worms, which is said to include three distinct kinds, the *madrassie*, *soonamooky* and *cramee*, and these yield a portion of what was formerly the Company's investment of Silk; secondly, the *Tusseh* Silk-worms, of which the *mooga*, *teerah*, and *bonbunda*, are described as different kinds; the cocoons of these are collected in September, and are called the Rain weather sorts; but there are others of the dry weather months which are denominated *dabba*, and *buggoy*. *Tarroy* is an inferior sort collected in December. The Tusseh, or Tussar Silk worm, is very extensively diffused, the Residents described the Worm as being reared in all the western forests from Ramghur to Midnapore. Dr. Roxburgh mentions it as a native of Bengal, Behar, and Assam, and that it is the same as the Bughy insect of other districts. The *Jaroo* is also described as a variety, by Dr. Buchanan Hamilton, and as occurring in the districts of Bhagulpore and Dinajepore; by Col. Sykes it was found in the Bombay, and by Dr. W. Geddes in the Madras Presidency.

Mr. Hugon, Sub-Assistant to Captain Jenkins, Political Agent in Assam, describes six species of Silk-worm as being found in the central part of that province. Of these, the Mulberry Silk-worm, (Bombyx Mori); the Tusseh Silk-worm Saturnia (Phalæna) paphia and the Eria, or Arindy Silk-worm Saturnia (Phalæna) cynthia, were previously well known; but the others have been described by himself and by Dr. Helfer. The Mooga Silk-worm (Saturnia assamensis, Helfer), was also evidently known to the Resident (v. Report, p. 52). The Joree Silk-worm (Bombyx religiosæ, Helfer), is a new species discovered by Captain Jenkins on the Peepul tree (Ficus religiosa). This is said to yield a Silk certainly equal to that of the Mulberry Silk-worm.

Saturnia sylhetica, Helfer, is a native of the Kassia mountains, and of Silhet and Dacca. It also yields Silk, as do two other species, the wild Silk-worm of the central provinces, and another, which produces its cocoon upon the Mangoe tree. This the people of Malda gather, and mix with Arindy Silk cocoons in spinning.

There are probably other species in different parts of India, which may be found to yield useful products.

These wild Silk-worms may be thought by many unworthy of notice, as they do not yield the kind of Silk most valued in commerce; but they are more important than they at first appear to be. We must remember that the culture of some in the forests, and the collection of all, affords employment to considerable numbers of the natives in the parts of districts least productive of useful occupation. They afford also clothing for many of the inhabitants, as Mr. Hugon informs us that Silk from the Eria, or Arindy worm (*Saturnia* (*Phalæna*) *cynthia*) is the daily wear of the poor in Assam, and is used by every class in winter. It is remarkable for its very great durability.

The Tusseh Silk is still better known, having also afforded the natives in Bengal, &c. a coarse durable Silk, which is much esteemed in India, both for ladies' and children' dresses; for the latter especially, on account of its cheapness and durability. As an instance of the quantities in which the Tusseh Silk is produced in India, we may adduce the evidence of Mr. R. Montgomery of the Bengal Civil Service, in the Azimgurh district only, where 318,772 pieces of Tusseh Silk are given as the quantity produced annually.

. *Mulberry Trees.*—The White Mulberry (Morus alba) is infinitely to be preferred as food for the worms of the Bombyx mori, and this has been introduced from China into Europe, as well as into India. Morus Indica, the species most common in Bengal, is thought by Dr. Wallich to be only one of its varieties. Morus atro-purpurea is a species introduced into India from China, where it is employed as food for the Silk-worm, though Dr. Roxburgh states, that it had not been found to answer for that purpose in Bengal. Two varieties (one, the Doppa Foglia), of the Italian White Mulberry, received from St. Helena, were established in the East India Company's Botanic Garden at Dapooree, in the Bombay Presidency. The then Superintendent, Dr. Lush, forwarded to Calcutta young plants, which, in September 1833, were reported by Dr. Wallich to be in a flourishing condition. Two other species are common in the plains of North-western India, and others have been introduced there from Caubul and Cashmere; one distinct species occurs, moreover, in the Himalayas.

Col. Sykes has drawn attention to the great importance of introducing into India the Mulberry called Morus multicaulis, a distinct species or variety introduced by M. Perrottet into France, in 1821, from the Philippine Islands, where it had been brought from China. It is now thought by many, both in Italy and France, to be the most valuable sort for cultivation, and has become a favourite variety in America. It is said, besides growing easily, and affording abundance of leaves of the most nourishing kind, to be able to withstand a considerable degree of cold.

All the wild Silk-worms feed upon different trees, such as the Jujube, Ficus religiosa or Peepul, the Castor Oil Plant, Terminalia catappa som of the Laurel tribe, and others, which are foun in almost all the forests of India.—*Royle's Pr ductive Resources of India.*

History of Silk trade with India.—Equ in antiquity to the growth of cotton wa the production of silk in the countries the East. Its limited extent, however, and tl monopoly of this valuable traffic in the hands the Phœnicians, and afterwards by the Persian restricted its employment within the most co fined limits. Until the time of the Roman en pire, its very existence appears to have bee unknown in the West; and when Dionysiu the imperial geographer, who visited the East i the first years of the Christian era, wrote an a count of this new and beautiful product, l speaks of it as a precious web, finer than th of the spider, combed by the natives from flow ers, and spun into rich garments of great pric Previous to the middle of the eighteenth ce tury, Indian raw silk formed a very inconsider ble portion of the trade from the East. Its gre inferiority to the Italian and French article w for a long period a great barrier to the profitab extension of this branch of Indian trade. Tl factors of the Company did no more than pu chase the silk as it reached their hands from tl three filatures, whence alone it came in thos days. At Cossimbazar, Rungpore, and Com mercolly, the natives grew large tracts of th common mulberry-plant, reared their worms, an reeled the produce of the cocoons; but with small regard to the exigencies of the worms, an so little care bestowed upon the preparation the silk, as to render it a most unprofitable an troublesome article in the hands of the Europea manufacturer; so much was this felt, that unt the latter part of the last century, Indian sil was employed but for the manufacture certain inferior minor articles of haberdasher and never entered into the composition satins, or silk piece-goods of any kind. O great cause of this inferiority was to be foun in the careless method of winding the silk fro the cocoons, which produced such inequality i the thread as to render it all but unserviceabl Besides this, it was loaded with gummy an other extraneous substances, and reeled witho the least attention to colour or quality; so th it reached the buyer's hands in hanks comprisin all sorts of shades. This part of their trad proved so annoying, and was attended with suc fruitless results, that the Company were at on time on the point of issuing orders to cease a purchases of the article. Instead of acting o this first impulse, the Directors wisely made a effort to remedy the evil complained of, by send ing to Bengal one or two persons acquainte with the Italian mode of reeling and assortin silk; these instructors were placed in the hear of the silk-districts, and appear, from after re sults, not to have laboured in vain. Inducements were at the same time held out to the ryots to extend the cultivation of the mulberry-plant, by allowing them all lands so used free of rent for two years, and afterwards assessing hem very moderately. In this manner the silk-trade received an impulse hitherto unknown o it, and the exports of the raw article rose from 80,000 lbs. in 1750, to 320,000 lbs. in 1770. The partial success which had attended the ntroduction of a better mode of reeling silk inluced the Company to attempt still further reorms; and we accordingly find that in the year 771 a second supply of practical silk-reelers nd mulberry-cultivators from Italy were dispatched to Bengal; proper filatures were estalished; a better mode of rearing the insects nd growing the plants was introduced; and in ddition to these measures, steps were taken to ecure a supply of eggs from China, with the iew of improving the breed of the Indian worms. everal years elapsed before these improvements ere beneficially felt in the quality of the silks nported from Bengal; but that such was the ase may easily be seen by the steady increase in he quantity taken by the manufacturers of Engnd, which in 1785 amounted to 576,175 lbs. he greatest improvement effected by the Comany at this period was the total abolition of the ontract system, and the substitution for it of gencies throughout the silk-districts, by means which supplies of the cocoons were constantly btained from sub-agents called bekars, who reeived advances in money, and who, in their turn, ngaged by similar means for the supply of silkorms from the rearers in the different villages.

The vast improvements effected in England wards the end of the last century in the anufacture of cotton goods tended in a great easure to check the consumption of the more stly article of silk; and we find that from 00,000 lbs. weight of raw silk sold in 1785, e silk Company did not dispose of more an, on the average, 300,000 lbs. weight the years 1800 to 1805. So much better ere the silk transactions of the Company anaged at this time, that in spite of is decline in the demand for their goods, their arly profits gradually increased from a few ousands to the enormous amount of 132,982*l*. 1801. The gradual decline to a certain date, in e imports of Bengal raw silk, from the cause ready assigned, may be seen by the following t of exports to Great Britain, taken at interls of ten years; and in the same may be served the effect of the gradual relaxation of e Company's trading monopoly in favour of ivate merchants. In 1782 there were shipped England from Bengal, 61[illegible],071 lbs.; in 1792 01,445 lbs.; in 1802, 114,744 lbs.; in 1812, 2,427 lbs.; in 1822, 1,042,617 lbs.; and 1832, 956,453 lbs.

Some idea of the commercial value of this branch of Indian trade may be formed from the fact, that between the years 1776 and 1785, the raw silk imported by the Company, and in the privileged tonnage by private traders, was worth 3,446,757*l*.; from 1786 to 1803, it amounted to 5,221,596*l*.; and from 1804 to 1810, to 3,115,041*l*.; being during these thirty-five years almost equal to 12,000,000*l*. sterling. Upon the last renewal of the East India Charter in 1833, which provided that the Company should no longer engage in mercantile operations, their extensive and well-organised filatures were put up for sale, and after some delay disposed of to private parties. These establishments were eleven in number, of which the following gave their names to the particular kinds of silk produced by each of them, and by which those varieties are to this day known in commercial circles; they are Bauleah, Commercolly, Cossimbazar, Hurripaul, Jungypoor, Radnagore, Rungpore, Santipore, and Surdah. Besides the above, the Company possessed a number of hired filatures of less note.

The exportations of Bengal raw silk in 1814-15 amounted in value to 231,271*l*.; in 1827-8 to 855,398*l*. and in 1837-8 to only 465,451*l*. Bringing down these figures to a more recent date, we find that the silk exports of Calcutta were, during the years 1848-9 and 1849-50, to the value of 714,000*l*. and 655,000*l*. respectively.

Indigenous Silk Worms of India.—Besides the China, or mulberry silkworm, there are several varieties of silk-spinning worms indigenous to India, of which mention is made in some of the earliest records of that country. These have been described by several scientific writers, and are known amongst the natives as the mooga, the arindy, the tussah, and the joree worms, all producing fibres, which, if not equal in commercial value to those of the mulberry-worm, are nevertheless esteemed and largely employed amongst the inhabitants of the districts in which they are found. These insects inhabit vast tracts of forest in Upper Assam, in the Madras Presidency, and in that of Bombay; and the cloths made from the raw material are in extensive use amongst not only natives but Europeans, who find them most economical and durable for many purposes. Some idea may be formed of the extent to which these kinds of indigenous silk are produced, when it is stated that in 1837 there were in one district alone not less than 318,772 pieces of tussah silk manufactured. The food of the wild silkworm is obtained from the trees of the forests inhabited by them, and amongst those known as affording them nourishment are the leaves of the jujube the castor-oil plant, the peepul, or banyan-tree, some of the laurels, and a few other plants.

Bombay.—So early as 1795, some attempt appears to have been made at Bombay to introduce the silk-worm, but evidently without effect ; for until 1823 we hear nothing more of the matter, and then it seems to have been attempted at one of the public jails by the labour of the prisoners, the result of which appears to have been the preparation of a few bales of silk for local consumption. Later still, the zeal and industry of an Italian gentleman were brought to bear upon the subject, and under his directions a better cultivation of the mulberry plant, and a method of feeding and reeling was introduced, unattended with permanent results.

Madras.—In Madras this branch of industry met with great encouragement so long since as 1791. No efforts were spared to induce the natives to enter fully into the rearing of the worm and the growth of the plant ; and, as the result shews, the success was, if not so great as in Bengal, still sufficiently encouraging.

China, History.—Silk is said by Chinese authors to have been known there for thousands of years. It has long been imported into India from China. The earliest notice, though there is some doubt about the passage, is in the Mahabharut where Cheenas, Hoonas, &c. are said to have brought silk, and silk-worms as presents to Yoodhistira.

Silk Worms and their products.—When the China silk-worm was first introduced into India as an object of culture we have no information ; but what is called the indigenous (*desee*) silk-worm is carefully distinguished from the China worm ; and there are several species of wild silk-worms, species of *Saturnia*, *Phalœna*, and *Bombyx*, all of which were shown at the Great Exhibition of 1851 with *Tussur*, *Moonga*, and *Eri* cloth. The former is much used in India by the natives, and is best known as an article of commerce, and has been used in Britain for parasols ; in India it is esteemed for children's dresses. The Eri cloth is extensively used as an article of clothing by the inhabitants of Assam. The silk of Bengal was originally very inferior in quality, and very carelessly wound. The East India Company, in the year 1757; sent Mr. Wilder to improve the winding of silk; and in the year 1769 other Europeans, as drawers, winders, reelers, and mechanics. The filatures were all in Bengal, and to the Southward of 26° of N. lat., for the northwest provinces are much too hot and dry for the silk-worm. Experiments were for many years made on the western side of India to introduce the culture of the silk-worm, under an Italian, M. Mutti; but they have lately been abandoned from want of success. Some excellent silk is being produced in Mysore, and it is probable that the culture might easily be carried on in the valleys of the Himalaya.—*Royle. Arts. &c. of India, page* 496. Moorshedabad has long been a central mart for silk goods, and a variety of specimens of silk were sent from thence, and some satins (*mushroo*) from Benares, Cutch, and Hyderabad, chiefly in alternate species of different colours. On the Bombay side the culture did not succeed, and the raw material is imported from China and dyed, but the manufacture has not on that account been neglected. The weavers seem, in fact, to have paid an extra degree of attention to their art, and sent to the Exhibition of 1851, silk which is well woven, and in a variety of patterns, together with an excellent specimen (called *pytanee*) of double weaving, being red on one side and green on the other, and showing the colours and patterns very distinct. This was from Poona. The silk, from Surat, Tanna, and Ahmednugger were also admired for their patterns, as well as the longees from Sindh. The silks from Cashmere attracted much attention, both from the substantial nature of the fabric, some of which is called tafeta, and for the moderate tone of the colours with which they are dyed. The flowered silks, or brocades, from Benares and from Ahmedabad, as well as those from Hyderabad, commanded notice for their richness and the happy disposition of pattern and combination of colours.—*Royle, Arts &c. of India, page* 497.

Mysore.—Surgeon Smith of the Madras Army, for many years in medical charge of the Mysore Commission, conducted experiments under his own superintendence, and the result of his observations contained in the following report may be relied on, as he spared no pains to make himself acquainted with the subject. General Sir MARK CUBBON, *Commissioner*. July. 1857

The cultivation of Silk is supposed to have been introduced into Mysore by Tippoo Sultan, and although the climate is evidently well calculated both for the growth of the Mulberry, and the development of Silkworms, the cultivation does not appear to have made any great progress until after the government of the country fell into the hands of the British in 1832.

The Mahomedans adopted the feeding and management of the worms and the reeling of the Silk as one of the few modes of gaining a livelihood to which they are not averse, purchasing the Mulberry leaves from the cultivators; and the Commissioner gladly encouraged the growth of Silk in every possible way, with a view of developing habits of industry among a class of men generally opposed to labor of any kind, unconnected with a Military life.

The open parts of the country alone seem to suit this cultivation, such as the Bangalore, Chittledroog, and open parts of the Astagram Divisions. None is grown in the Nugger, or in the Munjerabad sections of the Astagram Division, the climate is too damp in these last named Districts. Most of the Silk was formerly exported to Coimbatore and Tanjore,and a smaller portion found its way to Bellary and Dharwar, for consumption in Native manufactures. At this time (1857), there is a considerable consumption of the raw material in Bangalore and Mysore in the manufacture of Silk Shawls, Handkerchiefs and Native Cloths, &c.

In 1841, four specimens of Silk grown in Mysore, were sent to Bengal, two of the specimens were purchased in the bazar and two were from cocoons purchased in the bazar, and privately and carefully reeled. The object being to find out the defects in the Mysore Silk, and to know if it would be valuable as an export in the state in which it is sold by the Natives. The following are Extracts from the Report : " One of the most apparent faults of this Silk is " its bad colour. This arises from the circum- " stance of the cocoons having been boiled in cop- " per pans instead of earthenware, and I should " imagine that at the time of reeling the Silk, " the water in which the cocoons were placed " was not changed often, as should be done. " This latter precaution would not only have " assisted to give the Silk a better colour, but " would have freed it somewhat more from the " gum, the superabundance of which renders " these specimens harsh and hard." It appeared from the above Extract that the faults of the Mysore Silk lay not so much in the article itself as in its mode of preparation.

A garden originally planted as a private speculation was taken by the Mysore Government in 1842, with a view to try how far Signor Mutti's proposal of growing Silk from standard Mulberry trees was likely to succeed in Mysore, and benefit the country. The larger and upper portion of the ground was planted with cuttings of the St. Helena Mulberry, and a few China ones, the lower and wet part, with Philippine, both grew well and for the first few years promised well. Eggs were obtained from Mr. Groves' Establishment at Chittoor, from an Establishment in the Neilgherries, and some of the annual March bund from Mr. Blechynder's Establishment in Bengal : these latter being annual worms, it was hoped would have proved a valuable auxiliary to the Mysore breed, and enabled us to feed from the standard trees, but in spite of every care and precaution they hatched on the eleventh day as in Mysore and from that time regularly produced their crops every fifty days. The Silk was certainly a great improvement on that of Mysore, but the worms were delicate and required more care and attention, so that I much doubt if they were ever extensively used by the Natives.

The Sub Peshkar of Bangalore, a man familiar with the country method of reeling Silk, was sent to Chittoor and placed under the tuition of Mr. Groves, who had an extensive plantation of Mulberries and experienced reelers. The man returned to Mysore well qualified for his post of Superintendent of the Government Garden. Reels of the best construction were made by Colonel Green and so expert did the Natives become, that in 1846, the following is the report of the Bengal Chamber of Commerce on the specimens sent for that purpose.

Report of the Silk Committee on specimens of Raw Silk, the produce of the Sirkar Gardens at Bangalore, forwarded by the Agricultural Society at Madras.

" Your Committee have examined these speci- " mens with great interest, and should be pre- " pared to give an unqualifiedly favourable opi- " nion on them, had the thread been a very little " stronger : as it is, it is remarkably even, round, " and free from knibs and gouts, and the colour " very pure and uniform, indeed, with the single " exception of being somewhat too fine, the pre- " sent are most admirable samples of Silk."

" Your Committee would however remark " that an opinion often prevails among such as " are not practically versed in the manufactures, " that the finer the Silk, the better and more " valuable, but it may be too fine, and the " present specimens, your Committee think, are " finer than it would be safe to prepare for the " English market, for the difficulty of unwinding " such Silk is extreme, and adds enormously to " the charge of preparing it for the weaver. A " Member of your Committee, Mr. Laidlay, ob- " serves that he has known in more instances " than one the most disastrous results from the " mistake of reeling the Silk too fine, for it will " not bear to be unwound by the machinery used " for the purpose in England.

" Your Committee however beg to add, that " these specimens are in every other respect un- " exceptionable, so clean, even, and beautiful, " that the reeler who prepared them may be pro- " nounced competent to produce Silk of the first " rate excellence, nearly, if not quite equal to " Italian. " The soil and climate too must cer- " tainly be favorable to the culture." (Signed) Robert Watson, J. W. Laidlay. Calcutta, March 1846.

To F. S. Gabb, Esq., Secretary, Agricultural and Horticultural Society, Madras. Sir,—The Honorary Secretary of the Calcutta Agricultural Society has handed to me two sample skeins of Raw Silk, the produce of Bangalore, and a copy of your letter 26th February to his address, with " Extract from Proceedings of a Meeting of your Society wherein the specimen of the Silk is ordered to be sent to the Chamber of Commerce here for report."

" Having laid such communication and the " samples before the Chamber, I am desired to " inform you that they consider the Silk very " beautiful, but the thread is too weak for free " reeling, if of stouter thread it would pay well at " the price you quote. Both sorts are too fine " for ordinary purposes and could not be re- " wound without great waste, even twice their

“ thickness might be too fine to suit the English “ market, the staple not being strong enough “ to stand the action of the machinery used for “ winding and preparing the article for the use “ of the weaver, probably about 10 cocoons “ would afford the best size to reel. The co- “ coons from which these specimens were made “ must have been very good indeed, equal to the “ best annual cocoons of Bengal, but the thread “ especially the white, is endy and it is not “ twisted enough; with improved implements, “ and proper directions, the spinner should be “ able to produce an article of superior charac- “ ter and higer value.”

“ Though of minor importance I may here “ mention that the skeins would be better if not “ quite so thick. These weigh about 6 tolahs, “ whereas the skeins generally made in India and “ most approved in England weigh about 3 or 3½ “ tolahs, a size which is attended with several “ practical advantages,” (Signed) W. Limong, *Secretary.* Calcutta, Bengal Chamber of Commerce, *April 25th*, 1846.

The brokers, Messrs. Norton, Thilburn and Co. of Saint Mary Axe, London, reported of some samples of the Silk sent to them in 1850, as follows,“ This Silk with care in the getting up “ would prove a valuable substitute for many “ other classes, and from its intrinsic qualities “ would find a ready sale in this market.” These Extracts prove the capability of Mysore to produce Silk of first rate quality. But until filatures conducted by Europeans are established as in Bengal but little of the Silk will ever find its way to the English market, At present the Natives find a ready sale in India for all they can produce, and it answers their purpose better to reel it roughly and sell it as they do, for although clean reeling will produce a greatly enhanced price, the proceeds of the Silk will be much less and the sale of the raw material not so certain as it is now. Since 1846 the average annual produce of Mysore has been about 10,000 maunds of 24 lbs. or 240,000 lbs weight, a quantity sufficiently large to attract attention to its cultivation.

The standard mode of cultivation failed for reasons explained in the following Extract from a letter to the Commissioner, dated 11th August 1849.

“ When we consider the incessant demand for leaves made on the standard trees in consequence of the bi-monthly crops of silk which alone grow in Mysore, the cause of failure will be at once evident. The leaves of a plant are organs of respiration, digestion, and nutrition, a tree cannot be made to yield 5 or 6 crops annually without seriously impairing its vitality, if the leaves are stripped off a plant before the fruit has commenced ripening, the fruit will fall off and not ripen. If a branch is deprived of leaves for a whole summer, it will die, and not increase in size perceptibly, and this is exactly what has taken place with the standard trees at the Silk garden, they have aged, become woody, and throw out nothing but fruit unless pruned back to the stems, when an entire new set of branches is thrown out with an abundant crop of fine leaves; these branches by the loss of their leaves age and die within the year, and the same process has to be renewed; latterly the only mode of obtaining good leaves from the standards has been by cutting them down to the ground, the roots then throw up abundant fine shoots, a proceeding which in effect is returning to the bush system. On this subject I quote the following passage from a valuable little work by Count Dandalo on the “ art of rearing Silk worms.” He says—“ It has been said, that in Asia they “ obtain as many as twelve crops of cocoons in a “ year. And some person made experiments, and “ published some views on the subject; stating, “ that with us (that is in Italy) there might, at “ least, be gathered two crops; my experiments “ on the contrary tend to prove, that it would be “ a sure method of destroying the Mulberry trees, “ and consequently the entire breed of Silk “ worms. I cannot indeed bring myself strictly to “ believe, that in Southern Asia it would be “ possible to have such numerous crops of co- “ coons. The southern part of China corresponds “ very nearly, as to climate, with the Southern “ parts of Persia, and yet there, according to the “ illustrious Pallas, the boughs of the Mulberry “ trees are cut only twice in the year, so as to “ have in the same year two crops of cocoons. “ In those climates they prune the small branches “ twice a year, because the summer being long- “ er, the Mulberry tree is more vigorous there “ than it is with us. Here, on the contrary, the “ Mulberry tree cannot even bear the stripping “ of its foliage once a year without being injur- “ ed, and certainly would die if stripped twice.”

The Count is misinformed in regard to the number of crops annually. In Mysore, 6½ crops are the utmost ever obtained, each crop occupies 56 days, 33 in the worm, 12 in the cocoon, 11 in the egg, the insect requires food for 198 days in each year, where the succession is regularly kept up. The cultivation by standard trees is obviously not adapted to meet such an incessant demand. Of this, the Natives are perfectly well aware for Doctor Royle in speaking of the cultivation of the standard Mulberry, says, “ This practice is not entirely foreign to the “ Natives, as the Resident at Baulleah states that “ the annual worm prefers the leaf of the shrub “ which is well matured, to that which is young “ and tender, and therefore he infers that it “ would thrive better with the tree leaf than the “ shrub leaf. He also says, that the tree is “ cultivated in parts of the Rungpore and “ Radnagore districts for the production of “ cocoons. The Resident at Hurripal states, that

“ there, the method of cultivation differs from that “ in use about Baulleah and Malda the leaves “ being gathered only from standard trees, which “ are preferred on account of the dryness of the “ soil in that district.”

The following are two Extracts from a paper taken out of an old Chinese work on the cultivation of Silk, of sufficient interest for insertion in this place. After describing at length the management of the worms for an annual crop, or a spring and autumn one at most, he says, “ for if they (the Mulberry trees) are quite “ stript one year, they die and fail entirely the “ spring following.” After speaking of the necessity for feeding the young worms every half hour during the first 24 hours of their life he says, “ The reason why they take so much “ pains to make these little insects eat so often, “ is to forward their growth and make them spin “ the sooner, the great profit which they expect “ from these creatures depends upon this care, “ if they come to their full growth in twenty-“ three or twenty-five days, a hurdle covered “ with worms, whose weight at first was a *mass*, “ that is a little more than a drachm, will pro-“ duce twenty-five ounces of Silk, whereas, if for “ want of proper care and nourishment, they do “ not come to their perfection in less than 28 “ days, they will produce but twenty ounces, “ and if they are a month or 40 days in growing “ they will have but about 10 ounces.” This is a most interesting fact, and applied to breeding in general, shows the vital importance of supplying young stock with abundant nourishment while growing : there is perhaps no other instance in nature, in which such an experiment could have been so accurately tried and its results ascertained with almost mathematical precision.

On the subject of the comparative merits of the standard and bush modes of cultivating the Mulberry, I wrote to the Secretaries of the Horticultural Societies of Bengal and Bombay. From the latter I received no reply, which I regret, for I was anxious to know how far Signor Mutti’s plan had answered under his own superintendence. The Secretary to the Calcutta Agri Horticultural Society writes as follows : “ The system of growing the Mulberry, as a “ standard tree, has been tried in Bengal, and, “ so far as the result of my enquiries enables me “ to say, with as little success as has attended “ the experiment of the St. Helena variety on “ your side of India. The common bush Mul-“ berry is very much preferred by the people at “ Surdah, Commercally, Radnagore, and I be-“ lieve, all other parts of Bengal, where Silk “ cultivation prevails.”

More than one private speculation with standard trees failed at Chittoor, and Conoor, under energetic and intelligent European superintendence. I have no reason to think that the experiment has failed from any want of care or attention on the part of the attendants, they have done their best, and if the Commissioner will refer to the report of the Bengal Horticultural Society on the specimens of Silk sent to Bengal in 1846, he will there see that the qualifications of the reeler at the garden are first-rate. I have lately found when obliged to hire reelers to wind off a large crop that it is not difficult to get very good reelers among the Natives, and the reason why the Natives do not practice reeling their own Silk cleanly and fit for the European market, is that it is not saleable in this country and there is a demand for all that can be produced reeled in the country fashion, independently of which the increased value of the Silk cleanly reeled will not compensate for the loss of weight and increased time and expenses of reeling.

The standard trees are all worn out and useless, they require to be replanted, and if replaced by young trees not a leaf should be taken from them for he next five years. A large portion of the garden is laid down with the common country bush Mulberry cuttings, of the St. Helena for standards planted at distances of 20 or 30 yards from each other among the bushes, and this I think is the proper way of growing standard trees, which thus planted, in no way interferes with the bush system, and at the same time affords food in seasons when, from want of water or other causes the bushes fail. The Philippine planted as bushes have not answered, though the leaf is large and nutritious. It is said by the Natives not to yield an equal weight of food on the same space of ground.

I beg respectfully to suggest to the Commissioner either that the entire garden be laid down in the country fashion, with standard trees at intervals as above described, or else that it be let out to Natives to be cultivated in their own way, keeping up the present breed of worms, which are very superior to their own in the bright colour of the Silk. Surgeon C. J. Smith. Bangalore, 11th August 1849.

At present, 1857, the cultivation of Silk is carried on by the Natives in their own way, and by the bush system which they have found practically the best. Captain J. Cunningham, *Secretary*.

Hyderabad in the Dekhan. The chief of the manufactures and the only one for which Warungul is famed is that of Persian carpets which are made of all sizes and of worsted cotton, or even of silk.

Silk cloth, of the width of the curtailed guz, is manufactured and sold for 12 annas a yard, but the quality is very inferior. It is dyed red with lac, green with indigo and turmeric, or yellow with turmeric alone. The *tusser* cloth manufactured is only half the value of the silk. *Cholees*, (women’s boddices) are manufactured, but not in sufficient quantity to supply the district, as they are imported.

The other manufactures in the Circar are *tusser* cloths at Hoosainpurty—and Chilpore silks at Mutwarrah.

The *Tusser* cloth—although the cocoons are the produce of the same insect as those of Bengal—bears no comparison in fineness or durability with the *tusser* cloth manufactured there. The silks are dearer, and the cottons of the same price as those produced nearer Hyderabad.—*M. L. S. J. No.* 35, 1849, *p.* 27.

Raw silk is imported from Madras and manufactured into sarees and women's breast cloths at Mutwarrah, Warungul, Maytpilly and Aimulwarrah, in Elgundel, at Maiduck and other Kusbahs. This manufacture is entirely for home use, and no great skill or taste is displayed by the weavers, the silk pieces are of a quality inferior to those sold at the same price in the Hydrabad bazar, and were it not for the transit duties,the manufacture would become extinct. The silk cloths are dyed red with the lac dye and yellow with turmeric; no other dyes are used. Tusser or jungle silk, the produce of a species of Saturnia, is made into sarees, punchees, and scarfs, at several towns of the Sircar of Warungul. But the chief seat of the tusser maunfacture is the town of Mahdapore, on the right bank of the Godavery in the Ramgheer Sircar, where the moth that yields it is carefully reared, and from whence raw tusser silk is sent to other parts to be woven into cloth. The insect in its grub state is first fed on the tender leaves of the Careya sphærica, and, when more grown, on the leaves of the Pentaptera tomentosa; much watching and attention are bestowed in rearing the animal, subject as it is to destruction from birds, insects, and squirrels. The tusser cloths produced at Mahdapore are, in durability and fineness, very inferior to the cloths of the same kind manufactured in Bengal, they are dyed the same colour, and with the same materials as the silks, of which they are about one-half the price. At Mahdapore there are seventy to eighty families employed in rearing the insect and in the manufacture of the cloth, which is prepared principally for the Hydrabad market.—*J. M. L. S. No.* 38 *of* 1850 *p.* 224.

China. The two principal manufactures of China are, those of *silk* and *porcelain,* the originality of which was never contested, as the introduction of both into Europe is perfectly well ascertained; and could the Chinese urge no other claims to praise on account of their ingenuity, these two alone might serve to give them a high rank among the nations of the world. D'Herbelot justly considers that, as Rome obtained the silk manufacture from Greece, and Greece from Persia, so the last was indebted for it, according to the best Oriental authors, to China. The tradition, indeed, of the invention is there carried back into the mythological periods, and dates with the origin of agriculture. These two pursuits or professions, namely husbandry and the silk manufacture, the chief sources of food and clothing, form the subject of one of the sixteen discourses to the people, which have been before noticed. It is there observed, that "from ancient times the Son of Heaven himself directed the plough: the Empress planted the mulberry-tree. Thus have these exalted personages, not above the practice of labor and exertion, set an example to all under heaven, with a view to leading the millions of their subjects to attend to their essential interests." In the work published by imperial authority, called 'Illustrations of Husbandry and Weaving,' there are numerous woodcuts, accompanied by letterpress explanatory of the different processes of farming and the silk manufacture. The former head is confined to the production of *rice,* the staple article of food, and proceeds from the first ploughing of the land to the packing of the grain, the latter details all the operations connected with planting the mulberry and gathering the leaves, up to the final weaving of the silk.—*Mulberry Trees of China.*

Besides the common mulberry of China, which differs somewhat from that of Europe, they occasionally, in feeding the worms, have recourse to a wild specimen of the *morus* tribe, as well as to the leaves of another tree, supposed to be a variety of ash. The production of silk in the Chinese method, and with the aid of natives of the country, was tried experimentally by the East India Company at St. Helena; but has been abandoned, with the rest of their establishments on that island, since the expiration of the charter. The principal object, in the cultivation of the mulberry for feeding silkworms, is to produce the greatest quantity of young and healthy leaves without fruit. For this reason the trees are not allowed to exceed a certain age and height. They are planted at a convenient distance from each other, on the plan of a quincunx, and are said to be in perfection in about three years. The mulberry-tree for silkworms is chiefly cultivated in Che-keang, which province, together with the only three others that produce fine silk, namely, Keang-nan, Hoo-pe, and Sze-chuen, is crossed by the *thirtieth* parallel of latitude. Che-keang is a highly alluvial country, intersected by numerous rivers and canals, with a climate that corresponds pretty nearly to the same latitude in the United States of America. The soil is manured with mud, which is dug from the rivers, assisted with ashes or dung; and the spaces between the trees are generally filled with millet, pulse, or other articles of food. The time for pruning the young trees, so as to produce fine leafy shoots, is at the commencement of the year. About four eyes are left on every shoot, and care is taken that the branches are properly thinned, with a view to giving plenty of light and air to the leaves. In gathering these, they make use of steps, or a ladder with a prop, as the young trees cannot support a ladder, and would besides be injured in their branches by the use of one. The trees, with their foliage, are carefully watched, and the mischiefs of insects prevented by the use of various applications, among which are some essential oils. The young trees of course suffer by being stripped of their leaves, which are the *lungs* of plants, and this is an additional reason for renewing them after a certain time. They endeavour in part to counteract the evil effects, by pruning and lopping the tree, so as to diminish the wood when the leaves have been stripped, and it is probable that a few leaves are left on. It is surprising, however, to observe how soon a tree in those climates will recover its leaves in the summer or autumn, after having been entirely stripped of them by a typhoon, or hurricane. Fresh plants are procured by cuttings or layers, or sometimes from seed. When the trees grow too old for the production of the finest leaves, and show a greater tendency to fruiting, they are either removed altogether, or cut and managed so as to produce fresh and young branches. Mr. Barrow, who observed the management of the trees and silkworms in Chekeang, confirms the usual Chinese accounts, by saying that "the houses in which the worms are reared are placed generally in the centre of each plantation, in order that they may be removed as far as possible from every kind of noise; experience having taught them that a sudden shout, or the bark of a dog, is destructive of the young worms. A whole brood has sometimes perished by a thunder storm." The chambers are so contrived as to admit of the use of artificial heat when necessary. Great care is taken of the sheets of paper on which the multitudes of eggs have been laid by the silkworm-moths; and the hatching of these eggs is either retarded or advanced, by the application of cold or heat according to circumstances, so as to time the simultaneous exit of the young worms exactly to the period when the tender spring leaves of the mulberry are most fit for their nourishment. They proportion the food very exactly to the young worms by weighing the leaves, which in the first instance are cut, but afterwards, as the insects become larger, are given to them whole. The greatest precautions are observed in regulating the temperature of the apartments, and in keeping them clean, quiet, and free from smells. The worms are fed upon a species of small hurdles of basket-work, strewed with leaves, which are constantly shifted for the sake of cleanliness, the insects readily moving off to a fresh hurdle with new leaves, as the scent attracts them. In proportion to their growth, room is afforded to them by increasing the number of these hurdles, the worms of one being shifted to three, then to six, and so on until they reach their greatest size. The hurdles, as well as the rest of the apparatus, were sent from Canton to St. Helena for the use of the Company's establishment there. When the worms have cast their several skins, reached their greatest size, and assumed a transparent yellowish colour, they are removed into places divided into compartments, preparatory to their spinning. In the course of a week after the commencement of spinning, the silken cocoons are complete, and it now becomes necessary to take them in hand before the pupæ turn into *moths*, which would immediately bore their way out, and spoil the cocoons. When a certain number, therefore, have been laid aside for the sake of future eggs, the pupæ in the bulk of the cocoons are killed by being placed in jars under layers of salt and leaves, with a complete exclusion of air. They are subsequently placed in moderately warm water which dissolves the glutinous substance that binds the silk together, and the filament is wound off upon reels. This is put up in bundles of a certain size and weight, and either becomes an article of merchandise under the name of "raw silk," or is subjected to the loom, and manufactured into various stuffs, for home or for foreign consumption. Notwithstanding the apparent simplicity of their looms, they will imitate exactly the newest and most elegant patterns from England or France. The Chinese particularly excel in the production of damasks and flowered satins. Their Silk crape has never yet been perfectly imitated; and they make a species of *washing* silk, called at Canton *ponge*, which becomes more soft as it is longer used.—*Davies Chinese, Chap.* xviii. *p.* 30. *Ed.* 1851.

Fortune spent a few days in the vicinity of Nan-tsin, and as it may be considered the centre of the great Silk country of China, I shall, he says, endeavour now to give a description of the cultivation and appearance of the mulberry trees. The soil over all this district is yellow loam, well mixed and enriched by vegetable matter; just such soil as produces excellent wheat crops in England. The whole of the surface of the country, which at one period has been nearly a dead level, is now cut up and embankments formed for the cultivation of the mulberry. It appears to grow better upon the surface and sides of these embankments than upon level land. The low lands, which are owing to the formation of these embankments, considerably lower than the original level of the plain, are used for the production of rice and other grains and vegetables. It is therefore on the banks of canals, rice fields, small lakes, and ponds, where the mulberry is generally cultivated, and where it seems most at home. But although large quantities of rice and other crops are grown in the silk districts, yet the country, when viewed from a distance, resembles a vast mulberry garden, and when the trees are in full leaf, it has a very rich appearance.

The variety of mulberry cultivated in this district appears to be quite distinct from that which is grown in the Southern parts of China and in the silk districts of India. Its leaves are much larger, more glossy and have more firmness and substance than any other variety which has come under my notice. It may be that this circumstance has something to do with the superior quality of the silk produced in the Hoo-chow country, and is worthy of the notice of silk growers in other parts of the world. This popular variety is not reproduced by seeds and hence all the plantations are formed of grafted trees. Each plant is grafted from a foot or two feet above the ground, and rarely higher. The trees are planted in rows from five to six feet apart, and are allowed to grow from six to ten feet high only, for the convenience of gathering the leaves. In training them they are kept open in the centre; the general outline is circular, and they are not unlike some of those dwarf appletrees which are common in European gardens. The accompanying sketch gives a good representation of the habit and form of one of those trees which has attained its full size. The different methods of gathering the leaves in these districts are curious and instructive and show clearly that the cultivators well understand the laws of vegetable physiology. Leaves are not taken at all from plants in their young state, as this would be injurious to their future productiveness. In other instances a few leaves only are taken from the bushes, while the remainder are allowed to remain upon the shoots until the summer growth is completed. In the latter case the leaves are invariably left at the ends of the shoots. When the bushes have attained their full size, the young shoots with the leaves are clipped close off by the stumps, and shoots and leaves carried home together to the farm-yard to be plucked and prepared for the worms. In the case of young trees, the leaves are generally gathered in by the hand, while the shoots are left to grow on until the autumn. At this period all the plantations are gone over carefully; the older bushes are pruned close in to the stumps, while the shoots of the younger ones are only shortened back a little or allow them to attain to the desired height. The ground is then manured and well dug over. It remains in this state until the following spring, unless a winter crop of some kind of vegetable is taken off it. This is frequently the case. Even in the spring and summer months it is not unusual to see crops of beans, cabbages, &c., growing under the mulberry trees. During the winter months, the trees are generally bare and leafless. Those persons who are accustomed to live in countries with marked seasons, where the winters are cold, and where the great mass of vegetation is leafless, would not be struck with this circumstance in the silk country of China. But the view one gets in this country in the summer months, after the first clipping of the shoots, is curious, and striking. As far as the eye can reach, in all directions, one sees nothing but bare stumps. It looks as if some pestilential vapour had passed over the plain and withered up the whole of these trees, and the view is rendered still more striking by the beautiful patches of lively green which are observed at this time in the rice fields and on the banks of the canals. This system of clipping close in to the stumps of the old branches gives the trees a curious and deformed appearance. The ends of the branches swell out into a club like form, are much thicker there than they are lower down. After I had completed my inspection of the country near the town of Nan-tsin, I proceeded onwards to the west in the direction of Hoo-chow-foo. A few hours' sail on a wide and beautiful canal brought me within view of the mountain ranges which form the western boundary to the great plain of the Yang-tse-kiang, through which I had been passing for several days. The most striking hill which came first into view was crowned by a seven storied pagoda. It had a large tree by its side, equally striking in the distance, and which had probably been planted when the pagoda was built. I afterwards ascertained this to be the " maiden hair-tree" (Salisburia adiantifolia), a tree which attains a large size in this part of China, and is extremely ornamental.—*A Resid. among the Chi. p.* 343. The greater part of the silks and crapes used in this part of China are manufactured in the adjoining towns of Soo-chow and Kang chow. Flowered crape, however, a very beautiful production, is made in Hoo-chow. The process of manufacture is thus described by the Rev. Mr. Edkins in the " North China Herald' :—" Two men were engaged at a loom in a cottage on the side of a stream. One sat at the end of the loom moving five pedals, and directing the shuttle and all that needed to be done with the threads that lay horizontal on the frame. The other was perched over head to superintend the pattern. This he did by means of vertical threads tied up in bundles, a large number of which, distributed transversely through the threads of the horizontal frame beneath him, were at his disposal. These he raised according to the requirement of the pattern, and thus caused that elevation in the threads on the frame below that constituted the flowered part of the piece."—*A Res. among the Chi. p.* 354. If there was little to notice in these temples with reference to Buddhism and its rites there were objects of another kind which soon attracted my attention. The halls and outhouses of the monastery seemed to be converted for the time into a place for feeding silk-worms. Millions of these little animals were feeding in round sieves placed one above another in open frameworks made for this purpose. So great was the number of the worms that every sieve, and there must have been many hundreds of them, was crammed quite full. In one large hall I observed the floor completely covered with worms, I shall never forget the peculiar sound which fell upon my ear as I opened the door of this hall. It was early in the morning, the worms had been just fed and were at the time eagerly devouring the fresh leaves of the mulberry. Hundreds of thousands of little mouths were munching the leaves and in the stillness around this sound was very striking and peculiar. The place too seemed so strange; a temple —a place of worship with many huge idols, some from twenty to thirty feet in height looking down upon the scene on the floor. But to a Chinese there is nothing improper in converting a temple into a granary or a silk-worm establishment for a short time if it is required, and I suppose the gods of the place are supposed to look down with approbation on such scenes of peaceful industry. When from the large number of worms it is necessary to feed them on floors of rooms and halls, there is always a layer of dry straw laid down to keep them off the damp ground. This mode of treatment is resorted to when necessary, and not from choice. The sieves of the establishment, used in the frame work I have already noticed are greatly preferred. Whether the worms are fed on sieves or on the floor they are invariably cleaned every morning. All the remains of the leaf stalks of the mulberry, the excrement of the animals, and other impurities, are removed before the fresh leaves are given. Much importance is attached to this matter, as it has a tendency to keep the worms in a clean and healthy condition. The Chinese are also very particular as regards the amount of light which they admit during the period the animals are feeding. I always observed the rooms were kept partially darkened, no bright light was allowed to penetrate. In many instances the owners were most unwilling to open the doors, for fear, as they said, of disturbing them, and they invariably cautioned me against making any unnecessary noise while I was examining them. At this time nearly all the labour in this part of the country was expended on the production of the silk worm. In the fields the natives were seen in great numbers busily engaged in gathering the leaves; boats on the rivers were fraught with them; in the country market-towns they were exposed for sale in great quantities, and everything told that they were the staple article of production. On the other hand, every cottage, farm house, barn and temple, was filled with its thousands of worms which were fed and tended with the greatest care. On my way up from Hoo-chow-foo to Mei-chi and about the 23rd of June, I observed that many of the worms had ceased to feed and were commencing to spin. The first indication of this change is made apparent to the natives by the bodies of the little animals becoming more clear and almost transparent. When this change takes place, they are picked, one by one, out of the sieves, and placed upon bundles of straw to form their cocoons. These bundles of straw which are each about two feet in length, are bound firmly in the middle, the two ends are cut straight and then spread out like a broom, and into these ends the worms are laid, when they immediately fix themselves and begin to spin. During this process I observed the underside of the framework on which the bundles of straw were placed surrounded with cotton cloth to prevent the cold draught from getting to the worms. In some instances small charcoal fires were lighted and placed under the frame inside the cloth, in order to afford further warmth. In some of the cottages the straw covered with spinning worms was laid in the sun under the verandahs in front of the doors. In a few days after the worms are put upon the straw they have disappeared in the cocoons and have ceased to spin. The reeling process now commences and machines for this purpose were seen in almost every cottage. This apparatus may be said to consist of four distinct parts, or rather, I may divide it into these for the purpose of describing it. There is, first, the pan of hot water into which the cocoons are thrown; second, the little loops or eyes through which the threads pass, third, a lateral or horizontal movement, in order to throw the silk in a zigzag manner over the wheel; and lastly the wheel itself, which is square. Two men, or a man and woman, are generally employed at each wheel. The business of one is to attend to the fire and to add fresh cocoons as the others are wound off. The most expert workman drives the machine with his foot and attends to the threads as they pass through the loops over on to the wheel. Eight, ten, and sometimes twelve cocoons are taken up to form one thread, and as one becomes exhausted, another is taken up to supply its place. Three and sometimes four, of such threads are passing over on to the wheel at the same time. The lateral or zigzag movement of the machine throws the threads in that way on the wheel, and I believe this is considered a great improvement upon the Canton method, in which the threads are thrown on in a parellel manner. The water in the pan into which the cocoons are first thrown is never allowed to boil, but it is generally very near the boiling point. I frequently tried it and found it much too hot for my fingers to remain in it. A slow fire of charcoal is also placed under the wheel. As the silk is winding, this fire is intended to dry off the superfluous moisture which the cocoons have imbibed in the water in which they were immersed. During the time I was in the silk country at this time I was continually visiting the farm-houses and cottages in which the reeling of silk was going on. As silk is a very valuable production, it is reeled with more than ordinary care, and I observed that in almost all instances a clean, active, and apparently clever workman was entrusted with the care of the reeling process. The old temple at Hoo-shan, which I visited again on my way down, was in a state of great excitement and bustle. The quantity of silk produced here was very large, and all hands were employed generally all, rather averse to work of any kind, were obliged to take their places at the wheel or the fire. But as the silk was their own, they seemed, notwithstanding their habitual indolence, to work with hearty goodwill. On the following morning, when I awoke, I found myself quietly at anchor close by the west gate of Hoo-chow-foo, my boatmen having worked all night. I spent the next few days in the country to the northward bordering on the T'aihoo lake, and partly near the town Nan-tsin being anxious to see the end of the silk season. About the eighth, or from that to the tenth of July, the winding of the cocoons had ceased almost everywhere, and a few days after this there was scarcely a sign of all that life and bustle which is visible everywhere during the time that the silk is in hand. The clash of the winding-machines, which used to be heard in every cottage, farmhouse, and temple, had now ceased; the furnaces, pans, and wheels, with all the other parts of the apparatus in common use during the winding season, had been cleared away, and a stranger visiting that country now could scarcely have believed that such a busy bustling scene had been acting only a few days before. During my peregrinations in the silk country I made many inquiries amongst the natives as to the price of raw silk in the districts where it is produced. At Meiche the price was said to range from twelve to eighteen dollars for 100 taels of silk. At Hoo-chow and Nantsin, where the silk is of a superior quality, the prices in 1855 were from eighteen to twenty two dollars for 100 taels. The price of raw silk like that of every thing else, no doubt depends in a great measure upon the supply and demand, and varies accordingly.—*A Res. among the Chi. p.* 372.

The Honorable Mr. Morrison tells us that the mulberry is cultivated in all the provinces of China, except the most northerly, and silk is raised wherever the tree grows. The best raw silk, called *taysaam*, comes from the province of Hookwang; the *tsailee* also comes from that province and Cheaking; both kinds are called Nanking raw silk, and are chiefly exported to England. In 1833-34, the price of the best sorts was from £ 300 to £ 350 per pecul, and the annual exportation was between ten and twelve thousand bales; in 1836-37, it was upwards of twenty thousand peculs, much of which was shipped off at $ 500 per pecul, since that period, for some undiscovered reason, the quantity brought to market has fallen off, and although the prices range between $ 400 and $450, still the whole amount hardly exceeds 5000 bales in a twelve month. In the new tariff the duty is the same on the raw silk from all the provinces; for it is probable, that as the trade extends at Ningpo and Shanghae, inferior qualities of silk will be sent abroad; indeed, if the exportation of silk and tea does not increase, it is difficult to see with what commodities the Chinese are to buy the large amount of foreign goods that are likely to be brought to the new ports. The Nanking raw silk exported the past year will average $ 450 per pecul, or $ 100 higher than it is set down in the statement. The waste or refuse raw silk goes entirely to India. *Silk organzine* is "formed of two, three, or more singles (*i. e.* reeled threads after being twisted), according to the substances required, twisted together in a contrary direction to that of which it is composed are twisted." It is included in the statements of trade under the name of silk thread. Organzine is also called *thrown silk*, though there may be some difference between the two, as it is said organzine is not made by the Chinese; it is used in weaving piece goods. *Silk thread and ribbons* go to the United States, and South America. *Silk* piece goods of all kinds are shipped for the most part to the United States, Mexico and South America; but considerable quantities go also to England chiefly for re-exportation: one seventh of the total exportation in 1836-7 was in English ships. Instead of the annual export of $400,000 stated in the Table, it should be one million of dollars, and the duties put at $ 30,000. Most of the various descriptions of silk piece goods usually exported are enumerated in the Table; there are a few others, as gauze, crape shawls, levantines, taffeta, but all description of them is here omitted.—*Morrison.*

The manufacture of silk is original among the Chinese as well as those of porcelain and lacquered ware, and in neither of them have foreigners yet succeeded in fully equalling the native products. The notices of the cultivation of the mulberry and the rearing of silkworms found in Chinese works have been industriously collected and published by Mr. Julien by orders of the French government. From his work it appears that credible notices of the culture of the tree and manufacture of silk are found as far back as B.C. 780; and in referring its invention to the Empress Siling, or Yuenfi wife of the emperor Hwang-to, B. C. 2602, the Chinese have shown their belief of its still higher antiquity. "The Shi King contains this distich: The legitimate wife of Hwangti named Siling shi began to rear silkworms." The best silk is found in the provinces of Sz'chuen, Hupeh Chehkiang, and Kiangnan, but every province south of 45° N. produces it of different degrees of fineness. Probably the kind called *tsatle*, brought from Hupeh, is the finest silk found in the world. While the worms are growing, care is taken to keep them undisturbed, and they are often changed from one hurdle to another that they may have roomy and cleanly places ; the utmost attention is paid to the condition and feeding of the worms and noting the time for preparing them for spinning cocoons. Three days are required for them to spin, and in six it is time to stifle the larva ; and reel the silk from the cocoons ; but this being usually done by other workmen, those who rear the worms inclose the cocoons in a jar buried in the ground and lined with mats and leaves, interlaying them with salt, which kills the pupæ and keeps the silk supple, strong, and lustrous ; preserved in this manner, they can be transported to any distance, or the reeling of the silk can be delayed till convenient. Another mode of destroying the cocoons is to spread them on trays, and expose them by twos to the steam of boiling water, putting the upper in the place of the lower one according to the degree of heat they are in, taking care that the chrysalides are killed, and the silk not injured. After exposure to steam, the silk can be reeled off immediately, but if placed in the jars, they must be put into warm water to dissolve the glue, before it can be unwounded. The raw silk is an article of sale ; the sorts usually known in the Canton market are tsatle, taysaam, and Canton raw silk. The loom is worked by two hands, one of whom sits on the top of the frame, where he pulls the treddles, and assists in changing the various parts of the machine. The workmen imitate almost any pattern, excelling particularly in crapes, and flowered satins and damasks, for official dresses. The common people wear pongee and senshaw, which they frequently dye in gambier to a dust or black color ; these fabrics constitute most durable summer garments, and the pongee becomes softer by repeated washing Many of the delicate silk tissues known in Europe are not manufactured by the Chinese, most of their fabrics being heavy. The *lo* or law is a beautiful article, used for summer robes, musqueto curtains, festoons and other purposes, but is seldom sent abroad. The English words *satin*, *senshaw*, and *silk*, are probably derived from the Chinese terms *sz'tiin*, *sensha* and *sz*,' intermediately through other languages.—*Williams' Middle Kingdom, Vol.* I. *page* 123.

Silk, in Europe.—The discovery of the uses to which the cocoon of the silkworm might be applied, appears to have been first made in China : the written records of that country declare that an Empress was the first to unravel the filmy thread, and to work it into a web of cloth, and this is stated to have taken place 2,700 years before the Christian era. However this may be, it is a fact that when the existence of the silken fabrics of China became known in other countries, the manufacture was not in its infancy and imperfectly executed, but had attained a degree of excellence which proved a long and successful practice of it among the Chinese. Such indeed was its importance, that the very people and their country are named *Seres*, and *Serica*, in ancient writings, from the Chinese word *Se*, which signifies *Silk*. At length, about the middle of the sixth century, the western world received the great boon of a supply of silkworms' eggs : these were conveyed from China to Constantinople by two Persian monks, who had gone to the East as missionaries, and had observed in China the various processes connected with the rearing of the silkworm, the nature of the trees on which they fed, and the preparation of the silk. This occurred about the year 552, in the reign of Justinian, who gave every encouragement to the introduction of the valuable insect. The eggs were secretly conveyed from China within a hollow cane : at the proper season they were hatched, and the caterpillars were fed with the leaves of the wild mulberry tree. The monks continued to superintend, at Constantinople, the rearing of the insects, and the whole process of manufacturing the silk. From this small commencement the myriads of silkworms have sprung, which throughout Europe and western Asia have met the demand for silk, which has gone on increasing from that time to the present.

The silkworm in Europe, is the caterpillar of the mulberry tree moth (*Bombyx mori*) belonging to the tribe of mealy-winged nocturnal insects, of which in the summer evenings we see so many examples. The eggs of this moth are smaller than grains of mustard seed, very numerous, slightly flattened, yellowish at first, but changing in a few days to a blue or slate colour. In temperate climates they can be preserved through the winter without hatching until the time when the mulberry tree puts forth its leaves in the following spring. This tree forms the entire food of the caterpillar, and seems almost exclusively its own ; for while other trees and vegetables nourish myriads of insects, the mulberry-tree is seldom attacked by any but this insect, which in many parts of its native country, China, inhabits the leaves in the open air, and goes through all its changes without any attention from man, whose only care is to gather in the harvest of silk cocoons at the right season. In some parts of China, however, the silkworm requires the same care in the way of shelter, feeding, and nursing which in other countries is found necessary to ensure success. The common mulberry-tree (*Morus nigra*), so well known in Great Britain, is not the best species for the nourishment of the silkworm, although the caterpillar feeds readily on the leaves. The whitefruited mulberry, *M. alba*, a native of China, is the best, and is greatly preferred by the insect. It is now cultivated in many parts of Europe, frequently as a pollard by road sides. It comes into leaf a fortnight earlier than the black mulberry, which is an advantage in the culture of silkworms. The white mulberry does not thrive in Britain, the winters being too severe. There is another variety of mulberry, called the *Philippine* mulberry, which is a favourite in the south of France, on account of the size and quantity of the leaves, and the ease with which it can be propagated. In the south of Europe mulberry leaves are sold by weight in the market, and the buyer chooses them either young or mature, according to the age of the insects which are to feed on them. Young worms are fed on tender leaves, while full grown caterpillars require the stronger nutriment of the mature leaf. Attempts have been made to store food for the silkworm by drying the leaves in the sun, then reducing them to powder, and placing the latter in jars. This powder moistened with water is eaten with avidity by the silkworm; and may prove a valuable resource in late seasons, or under circumstances which affect the principal crop. It is even thought that three or four crops of cocoons per year may be obtained even in northern climates, by keeping successive hatchings of eggs in warm rooms, and supplying the worms with this food during winter. The silkworm, when first hatched, is about a quarter of an inch long, and of a dark colour. If supplied with appropriate food it remains contentedly in one spot: this is the case throughout its changes, so that there is no trouble in retaining it within bounds, as there would be with some other caterpillars, After 8 days' feeding and rapid increase of size, it prepares to change its skin, the first skin having become too small for its body. It remains 3 days without food, during which time a secretion forms on the surface of the new skin, which helps the caterpillar to cast off the old one; but the operation is further facilitated by silken lines which the insect casts off and fixes to the adjacent object: these hold the old skin tightly, while the caterpillar creeps out of it. The whole covering of the body is thus cast off, including that of the feet, and of the teeth and jaws, but it is done with difficulty, and sometimes the skin breaks, and a portion of it remains attached to the hinder part of the body, compressing it, and usually causing death. The newly moulted worm is pale in colour, and wrinkled; but it immediately recovers its appetite, and grows so rapidly that the new skin is soon filled out, and in 5 days another mould becomes necessary. Four of these moults and renewals of the skin bring the caterpillar to its full size, when its appetite becomes voracious, and the succulent parts of the mulberry leaves disappear with extraordinary rapidity. The insects is now nearly 3 inches long; its structure consists of 12 membranous rings, which contract and elongate as the body moves. There are 8 pairs of legs; the first 3 pairs being covered with a shelly or scaly substance, which also invests the head. The mandibles are strong, and indented like a saw. Beneath the jaw are 2 small orifices, through which the insect draws its silken lines. The silk is a fine yellow transparent gum, secreted in slender vessels, which are described as being wound, as it were, on 2 spindles in the stomach; these vessels, if unfolded, would be about 10 inches long. The insect breathes through 9 pairs of spiracles distributed along the sides of the body. The caterpillar has 7 small eyes near the mouth; the 2 spots higher up are not eyes, but portions of the skull. Arrived at maturity, the caterpillar is of a rich golden hue; it leaves off eating, and selects a corner in which to spin its cocoon. It first forms a loose structure of floss-silk, and then within it the closer texture of its nest, of an oval shape: here the caterpillar remains working until it is gradually lost sight of within its own beautiful winding-sheet. Taking no food, and emitting this large quantity of silk, its body diminishes one-half, and on the completion of its cocoon it changes its skin once more, but then becomes an apparently inanimate chrysalis, or aurelia, with a smooth brown skin,and pointed at one end. It remains in this corpselike state for a fortnight or 3 weeks, when it comes forth a perfect winged insect—the silk moth. In escaping from the cocoon it pushes aside the fibres, first moistening the interior of the cocoon with tasteless liquid from its mouth to dissolve the gum which holds the fibres together. The mouth has no teeth, therefore it cannot gnaw its way out as generally supposed. In the perfect form, the insect takes no food, and only lives 2 or 3 days: the female dies soon after laying her eggs, and the male does not long survive her. The common silkworm is not the only caterpillar from whose cocoons silk has been obtained for manufacturing purposes; but it is so superior in the quality and quantity of its silk to all other insects, that small mention is made of any other. The larvæ of many European moths produce a strong silk, and the native silkworms of America yield a material which has been manufactured into handkerchiefs, stockings, &c. by the inhabitants of Chilpancingo, Tixtala, and other places of South America. The ancient Mexicans used the internal layers of white cocoons, which strongly resemble Chinese paper, as a material for writing on. A quantity of inferior silk is obtained in India from the Tusseh and Arindy silkworms, both natives of Bengal. The first affords a coarse dark-coloured silk, which is woven into a cheap durable cloth ; the second yields a delicate flossy silk, which cannot be wound from the cocoons, and is therefore spun like cotton. Of this, a coarse kind of white cloth is manufactured, which is loose in texture, but so durable that it can scarcely be worn out in a life-time. The domestic treatment of the silkworm has been brought to great perfection in Italy. Formerly the eggs were hatched at uncertain periods, depending on the natural warmth of the season, or they were put in manure-beds, or were worn in little bags about the person next the skin. They are now hatched in an apartment heated to the proper degree by a stove ; but they are first washed in water, and afterwards in wine, to separate light eggs, as well as dirt, and the gummy envelope which surrounds the heavy ones. The temperature of the hatching-room is at first 64°, but is gradually raised 1 or 2 degrees daily, until it reaches 82°, which it is not to exceed. Pieces of coarse muslin, or of white paper pierced with holes, are placed over the eggs when they are about to be hatched. Through these the worms creep to the upper surface, and are removed as soon as possible to a cooler place. Young leaves and sprigs of mulberry are laid upon the muslin or paper, when the worms eagerly settle on the leaves, and can thus be transferred to trays, and removed to the nursery. This is a dry room of regulated warmth, with windows on both sides, so that free ventilation may be attainable. Chloride of lime should be in use to purify the air, and a thermometer and hygrometer to regulate the heat and moisture; the latter is apt to abound where silkworms are kept, and is very prejudicial to them. Moist exhalations arise from the leaves and from their bodies ; fermentation, also, soon takes place if litter and dung be not speedily removed from their trays ; these are fertile sources of disease among the worms, and may carry off thousands in a day. One of the diseases to which silkworms are liable is of an extraordinary character, consisting of the formation of a minute cryptogamous plant of mildew within the body of the living insect. Damp and fermenting food and litter produce, in the first place, among the fatty matter of the body of the caterpillar, an infinite number of sporules supported by minute stems. These increase to such a degree that the vegetation soon pierces the skin, gives a general mealy appearance to the body of the caterpillar, ripens its seed, which is borne by the winds to every part of the nursery, carrying contagion with it, and at length causes the death of the worms. The dead bodies of worms or moths (for the insect is infected in all stages) are sources of contagion unless immediately destroyed. This disease is called *Muscardine* in France, *calcinetto* in Italy ; the French name arises from the resemblance of the diseased caterpillar to a mealy kind of sugar-plum made in Provence, and sold by the name of muscardine ; the Italian name also refers to the chalky or mealy surface of the skin. Various fumigations and washes have been tried, in order to purify infected nurseries, and to preserve others from the ravages of this malady : a solution of blue vitriol (sulphate of copper) applied to the wood-work, frames, &c. of the nursery is of great use in destroying the seeds of the fungus, but nothing is so good a preservative as rigid attention to cleanliness and good ventilation. The improved means, first employed in Italy, for preserving the health of these valuable insects, are due to Count Dandolo, who gave particular and scientific attention to the subject, and superseded many an absurd custom in the rearing of silkworms. According to his method wicker shelves are arranged in a room at convenient distances, and are lined with paper on which the worms are placed. Such worms only are placed together as have been hatched at the same time, the space allowed them being, for each ounce of egg, 8 square feet during the first age, 15 feet for the second age, 35 feet for the third age, 82½ feet for the fourth, and about 200 feet for the fifth age. The mulberry-leaves are chopped in order to present a large number of fresh-cut edges to the young insect. Four meals a-day, as a regular rule, and luncheons between when the worms are particularly voracious, is the liberal allowance for their subsistence. The temperature at which silkworms are healthiest appears to be from 68° to 75°, though they are able to bear a much higher temperature. Alternations of heat and cold are exceedingly injurious to them. When the silkworms are about to spin they are provided with little bushes of broom, heath, or other flexible substance, which are arranged upright between the shelves, their tops being bent into an arched form by the shelf above. The bushes are spread out like fans, to allow plenty of space for the cocoons ; for if crowded. the worms are apt to form double cocoons, two working together, and these are worth only half the price of single cocoons. Specimens of these bushes, laden with cocoons, appeared in the Great Exhibition, like diminutive trees bearing golden fruit. There were also illustrations in abundance of the advanced state of silk culture in France, and of the success of a series of systematic attempts which have been made in that country to improve the breed of silkworms, and to lessen their liability to disease. The *Central Society of Sericiculture of France* exhibited beautiful specimens of silk, remarkably pure in colour, strong, and lustrous. In the department of the Drome, where the culture is so extensive that upwards of 2,000,000 of mulberry-trees are required to supply the food of the myriads of worms, the method of managing the insects is slightly different from that which we have described. Instead of wicker shelves lined with paper, large bamboo like rushes which grow on the banks of the Rhone, are cut down, split open, and attached together so as to form long cane beds about 2½ feet broad, called *claies*. These are arranged one above another on a rude framework erected throughout the chamber, spaces being left at intervals as passages for the attendants to traverse. The worms, as soon as they are hatched, are strewed among the *claies*, and the mulberry leaves at the proper moment scattered over and amongst them. The attendants make use of a short ladder to ascend to the higher *claies*. In other establishments the *claies* are arranged so as to hang from the circumference of large wheels placed at each end of the apartment; by turning these wheels the ranges of shelves rise and fall, and are transferred from side to side at the pleasure of the attendant. British India possesses the climate and the abundance of labour favourable to this undertaking; accordingly, we find the culture of the silkworm spreading and improving in that country. In Bengal there are 8 or 10 principal factories or *filatures*, each employing from 3,000 to 10,000 persons, and the results of the Great Exhibition prove the fine quality of the silk obtained. The manufacturing treatment of the silk, when the labours of the silkworm are over, is as follows:—When the crop of cocoons is complete it is gathered from the bushes, and bout one-sixtieth part is set aside for the production of eggs, the finest cocoons as to web and colour being selected for this purpose, A difference of weight generally determines which are the cocoons of male, and which of female insects: the latter are heavier and rounder than the former. The cocoons intended to produce eggs are preserved in a very dry room, and in about 10 days, they lose in weight to the amount of 7½ per cent. The main crop of cocoons is next sorted into 9 qualities, known in the factories as—1. *Good cocoons*, which are strong, firm, almost equally round at both ends, not very large, but free from spots. 2. *Calcined cocoons*, in which the worm has died *after* having completed its work, and is reduced to a powdery substance. 3. *Cocalons*, which are larger and less compact than good cocoons. 4. *Choquettes*, cocoons in which the worm has died *before* finishing its work. 5. *Dupian*, or double cocoons, difficult to unwind, and often kept for seed. 6 *Soufflons*, cocoons of so loose and soft a texture that they cannot be unwound. 7. *Pointed cocoons*, in which one end rises in a point, which breaks off after a little silk has been unwound, and so spoils the thread. 8. *Perforated cocoons*, from which the moth has escaped. 9. *Bad choquettes*, in which the silk is spotted, rotten, and blackish in colour. The vitality of the chrysalis is destroyed previously to unwinding the cocoons: this is done either by exposure to the sun, or by artificial heat, such as that of an oven after the bread is withdrawn. The floss silk is removed from the cocoon by opening it at one end and slipping out the cocoon. In reeling, it is necessary to use cocoons of one quality, as different qualities require different treatment. The natural gum of the cocoons is softened by immersion in warm water, kept at the proper temperature by a charcoal fire, or by a steam pipe. After they have remained in it for a few minutes, the reeler (generally a woman) gently stirs up or brushes the cocoons with a short birch-rod, and to this the loose threads of the cocoons adhere, and are thus drawn out of the water. They are then taken 4 or 5 together, twisted with the fingers into one thread (as many as 30 can be wound together) and passed through a metal loop, which rubs off dirt and impurities; it then passes on to the reel, which has a slight lateral motion, so that the thread of one revolution does not overlay the other. If it were allowed to do so, the threads would be glued together before the gum had time to harden by exposure to the air. When any single thread breaks or comes to an end, its place is supplied by a new one, that the united thread may be of equal thickness throughout. The new thread is merely laid on, and adheres to the rest by its native gum, and as the filaments are finer near their termination than at the commencement, it is necessary to add other cocoons before the first set is quite exhausted. The cocoons are not entirely wound off, but the husk containing the chrysalis is used, together with the floss silk, under the name of *waste*. Improved methods of reeling are introduced from time to time, but they are on the same principle as the above. The length of filament yielded by a single cocoon is 300 yards, though some have yielded upwards of 600 yards. Eleven or twelve pounds of cocoons yield one pound of silk, from 200 to 250 cocoons going to the pound weight: thus about 2,817 cocoons are included in that quantity. The reeled silk is made up into hanks for sale and use. The form and contents as well as the quality of these hanks differ according to the quarter whence they are received.—*Tomlinson*. See BOMBYCIDÆ. MORUS, MULBERRY: SATURINA.

(7617) SILK CARPETS. At the Madras Exhibition of 1855, some very handsome specimens were contributed by the Tanjore and Hyderabad Local Committees, and His Highness the Rajah of Tanjore exhibited a very large silk carpet (No. 253) intended as a present for Her Majesty Queen Victoria. The colors were brilliant, the pile close and velvety, and the pattern harmonious. The Jury considered His Highness entitled to a 1st Class Medal.—*M.E.J.R.*

(7618) SILK COTTONS. The species of Bombax, which are remarkable for their gigantic stature and their splendid inflorescence, on account of their capsules, which, on bursting, display a flocculent substance, are often mistaken by travellers for cotton, and the tree is hence called *Cotton tree.* But as this substance is more silky than cotton, it has been distinguished by the name of *Silk Cotton.* It differs also in not spinning like cotton. Some difficulty, therefore, is experienced in making use of this very abundant cotton like produce; but Mr. Williams, of Jubbulpore, has succeeded in spinning and weaving some of it so as to form a very good coverlet. It might be easily made use of for stuffing pillows, muffs, or coverlets, for wadding, or for conversion into half-stuff for paper-makers, perhaps for making gun-cotton. In the 'Trans. of the Agri-Hortic. Soc.,' iii. p. 274, there is a report from the Society of Arts on two pieces of cloth made from the Simool or Silk Cotton tree; and it is observed that, from the shortness of the staple of the down, and its elasticity, it could not be spun by cotton-spinning machinery.—*Royle.* At the Madras Exhibition of 1855, small samples of the silk cotton from the *Bombax, Ochroma lagopus, Calotropis* and *Cryptostegia* were exhibited, but they appear to have been put to no other use than stuffing pillows; they might be employed for the manufacture of paper, and the silky down of the Cryptostegia being very strong might be applied to some textile manufactures. —*M. E. J. R.* Thus, the products of several plants, the *Bombax, Eriodendron,* the Ochroma lagopus, the feathery silk-like material in the pods of the Calotropis gigantea, and the Cryptostegia are so named. A trial has been given to the cotton of Calotropis gigantea, and Cryptostegia, as a material for cloth and cord, but their principal use hitherto has been for stuffing pillows: they might be employed as a material for making paper. There are two genera of plants, known under these names, Cotton tree or Silk cotton tree; the red and white cotton trees, common in many parts of India They belong to the natural family Byttneriaceæ.—The red cotton tree and silk cotton tree, Bombax malabaricum, and white cotton tree, Eriodendron anfractuosum. Some difficulty is experienced in making use of the very abundant floss or cotton like produce of these trees; but it has been spun into cloth, and it might be employed for stuffing pillows, muffs, or coverlets for wadding, or for conversion into half stuff for paper makers: perhaps for gun cotton. From the shortness of the staple of the down, and its elasticity, it could not be spun by cotton spinning machinery.—*Royle, Mason.*

(7619) SILK GOODS. Those of China, go mostly to the United States, and raw silk to England, the supply is not equal to the demand, and only about ten thousand bales are now exported, while upwards of twenty thousand were sent off, mostly to England, in 1836, some of which rated as high as 500 a pecul. The refuse raw silk goes to India. The exportation to the United States for making silk thread is trifling. Silk goods are shipped to the United States, Mexico and South America, and elsewhere, to the annual value of about a million of dollars; they consist chiefly of pongees, handkerchiefs, crape-shawls, scarfs, sarsenet, senshaws, levantines and satins; ribbons, sewing thread, and organzine or thrown silk, are not much shipped. The silk trade is more likely to increase than any other branch of the commerce, after tea, and the Chinese can furnish almost any amount of raw and manufactured silks, according to the demand for them.—*Williams.*

(7620) SILK GUT or SILKWORM GUT. A hard, white, transparent thread, about a foot in length, made in Italy and China, from the intestines of the silk worm, and used for angling. —*Waterston—Faulk.* *Silkworm Gut* is prepared for the angler as follows:—A number of the finest silkworms are selected when they are about to spin: they are killed by being immersed in strong vinegar, in which they are left for 12 hours closely covered up: should the weather be cool they may be left in the vinegar 2 or 3 hours longer. When removed therefrom, and pulled asunder, two transparent yellow green cords will be observed: this is the silkworm gut: the other portion of the entrails are of a dark-green colour. If the gut be soft, or break by stretching, that is an indication that the worm has been taken out of the vinegar too soon. When the gut is fit for drawing out, one end is to be dipped into the vinegar, and the other to be gently stretched to the required length, and it must be kept extended on a thin piece of board by inserting its extremities into slits in the end of the wood, or fastening them to pins, and in this state it is placed in the sun to dry.—*Tomlinson.*

(7621) SILK WORM.

Puttoo poochie, TAM.
Reshm ke keerch, DUK.
Puttoo poorughoo, TEL.

These are the names of the common sort, but there is frequently met with in the southern parts of India, a large species of caterpillar, of a dirty, brownish, yellow color, which produces a very coarse kind of silk, or rather thread, and has, on this account, got from the weavers the name of "Nar puttoo pootchie," it is nearly three times as big as the common silk worm and its body is marked, not with seven, but eleven rings.—*Ainslie's Mat. Med. p.* 296.

(7622) SILPHIUM (Σίλφιον). Ancient anthors mention this plant and its juice. Two kinds of this substance are described; one, from Cyrene, was probably yielded by *Thapsia Silphium* [LASER]; and the other was most likely assafœtida, which has been employed medicinally by Asiatics from very early times, though it has been known by this name in comparatively modern times. *Silphium* was however remarkable for other properties, and hence has attracted the attention of modern travellers who have recently visited the countries where the *Silphium* is described as growing by the ancients. The army of Alexander, in crossing the mountain range which Arrian calls Caucasus (iii. 28, 10), and which is the same range that he afterwards mentions under the name of Paropamisus (v. 5, 3), met with the *Silphium* Arrian says, on the authority of Aristobulus, "In this part of the Caucasus nothing grows except pines and *Silphium*, but the country was populous and fed many sheep and cattle, for the sheep are very fond of the *Silphium*. If a sheep should perceive the *Silphium* from a distance, it runs to it, and feeds on the flower, and digs up the root and eats that also. For this reason, in Cyrene, they drive the sheep as far as possible from the spots where the *Silphium* grows, and some even fence in such places to prevent the sheep from entering them if they should approach; for the *Silphium* is worth a good deal to the Cyrenæans." Burnes, in crossing the Hindu Koosh, and seeing both the men and cattle eating the young parts of the assafœtida plant, supposed that it must be the *Silphium* of Arrian. But as this author describes the country where the *Silphium* grows as abounding in cattle, Dr. Royle had concluded that the *Prangos* of Mr. Moorcroft was the *Silphium* alluded to, and which is much fed on by sheep and cattle in the present day in Tibet, Mr. Vigne, when travelling in these regions, came to the same conclusion. It is probable therefore that both plants, being umbelliferous, and employed for the same purposes in nearly the same regions, may have contributed to form the accounts which are so brief in ancient authors. —*Eng. Cyc*

(7623) SILVER.

Fazzeh, ARAB.
Peddie, CYNG.
Yin, CHIN.
Solv, DAN.
Zilver, DUT.
Argent, FR.
Silber, GER.
Nugdee Chandee, GUZ.
Rupa, HIND.
Argento, IT.
Argentum, LAT.
Perak MAL.
Nokra, PERS.
Srebro, POL.
Prata, PORT.
Serebro, RUS.
Rajata, Rupya, SANS.
Plata, SP.
Vellie, TAM.
Vendie, TEL.
Silfver. SW.
Salaka, JAVANESE.

Silver is one of the most anciently known of the metals, is found native and also combined with Sulphur in considerable quantities, also as a Chloride, and alloyed with other metals, especially Lead, Gold, Antimony, Arsenic, Copper. It is separated from its ores by the process of amalgamation. The Arabs are thought to have been the first to employ it in medicine. In its metallic state it is inert, but being little liable to alteration, or to be affected by reagents, it is much employed for surgical instruments and for vessels for chemical purposes.—*Royle*. Among the metallic ores of Southern India, holding the promise of being marketable, are a rich ore of galena or sulphuret of lead from Jungumrazpillay in the vicinity of Cuddapah. This ore is rich in silver, and is worked by the Natives on this account, but all the lead is wasted and the silver is obtained by a tedious, clumsy, and expensive process. Mr. H. L. Pattinson's new process for separating the metals by careful, slow-cooling and crystalization, is applicable to this ore. The re-examination of the first specimen of a Kurnool ore proved it to contain upwards of 1 per cent of silver, or 374 ounces in the ton, the quantity of lead and silver together being only 45 per cent which was occasioned by there being a considerable quantity o gangue disseminated through the portion examined. Another specimen, given by Colonel Cotton, and also said to be from Kurnool, was found to contain 175 oz 3 dwts. in the ton. Dr. Scott some years ago examined a specimen of the Kurnool Galena and found it to be free of silver. But the re-examination of the specimens in 1857, revealed the fact that at least some portions are very rich in the precious metal and this accords with the recent researches of Malagah and Durochet who have found that when Sulphide of Silver is associated with the Sulphides of other metals, it is *always* unequally distributed. It would appear therefore from the above facts that it would be quite impossible to calculate, with any approach to accuracy, from the examination of any given specimen, what would be the average yield o silver in a silver lead mine, until it is actually worked for the separation of that metal. Considering however that nearly one half of the silver now in circulation in Great Britain is recovered from silver lead ores similar to the above, and seeing that it is found to be advantageous to separate the precious metal where it exists to the extent of only 6 ounces in the ton, it became evident that these ores must be of great valu provided they can be found in sufficient quantity From recent information obtained from Kurnoo it would appear that the Galena there occur abundantly in all probability; therefore it would prove to be highly remunerative to work thi mine, both for the lead and silver contained in the ores.—*M. E. of* 1857.

Silver has been got, in trifling quantities, in upper India. The late Mr. W. Mainwaring found it in the Madura district in a native Sulphure of Zinc (blende) Captain Arthur was the first wh discovered this metal in Mysore, both in it native state (in thin plates adhering to som specimens of Gold crystallized in minute cubes and as a muriate in an ore containing Sulphu and oxide of Iron.—*Ainslie*.

At the Madras Exhibition of 1857, a rich ore o Argentiferous Galena was exhibited from Martaban by Dr. Brandis, granular, or in minute crystals, with silver passing through it in thread veins. This ore assayed by Dr. Scott, contains about 80 per cent of silver lead. The quantity of silver was found to vary in the portion examined from 70 to 300 ounces in the ton of ore. It is inposible therefore to say what its commercial value may be, unless an average sample were obtained, but if the ore exists in any quantity and of the same quality as that examined, it is a most valuable one, and would be well worth working by Pattenson's mode for separating the silver, as the process proves remunerative where only 7 ounces of silver can be obtained from a ton of metal.—*M. E. J. R.* This is probably the ore referred to by the Rev. Francis Mason, A. M. in his publication on the natural productions of Burmah, where, he says, the limestone of the Provinces probably contains a large quantity of lead: in the valley of the Salwen there is a rich vein of argentiferous galena, which is reported to appear on the surface. A specimen which Dr. Morton sent to England for analysis, was said to be a very valuable mineral, and destined to make a fortune for some one. Professor Mitchell in the certificate that he furnished Dr. Morton of the analysis, says, it contains Lead, Sulphur, Silver, Gold, (traces) Lime, Magnesia, Iron, Silica, and Carbonic Acid. It is a sulphuret of lead or galena. The quantity of lead and silver appears to be considerable, but there was not sufficient of the mineral to estimate either." The ore is seen in the limestone precisely as galena is found in the limestone of the Mississippi, one of the richest known deposits of lead in the world. —*Mason.* In a small hand specimen from Martaban the amount of silver was found to vary in different portions of it, the per centage of lead being about 75. In the first trial, the silver was found to amount to about 70 ounces to the ton of the ore; but in the second to not less than 300 ounces in the ton, or a little less than 1 per cent.—*M. E J. R.* Mr. O'Riley had a specimen of an ore of silver, antimony, copper, and sulphur brought him, which produced thirty-five per cent of silver; and the Tavoy gold, it would appear, contains nearly ten per cent of the same metal.—*Mason.*

Silver is brought from Yeman near the borders of Cochin-China and the mines in that region must be both extensive and easily worked to afford such large quantities as have been exported during the last five years.—*Williams' Middle Kingdom, p.* 144. Gold is found in many parts of the Japanese Empire, sometimes it is obtained from its own ore, sometimes from the washings of the earth or sand and sometimes it is mixed with the copper. The quantity in the country is undoubtedly great. An old spanish writer of the seventeenth century tells us that in his day the palace of the Emperor at Yeddo, as well as many houses of the nobility were literally covered with plates of gold. In the beginning of the Dutch trade the annual export was £840,000 sterling and in the course of sixty years the amount sent out of the Kingdom through the Dutch alone was from twenty-five to fifty millions sterling. Silver mines are quite as numerous as those of gold. In one year the Protuguese, while they had the trade, exported in silver £587,500 sterling. Copper abounds throughout the whole Japanese group and some of it is said to be not surpassed by any in the world. The natives refine it and cast it into cylinders about a foot long and an inch thick. The coarser kinds they cast into round lumps or cakes. Quicksilver is said to be abundant but this, so far as we know, has never been an article of export. Lead also is found to be plentiful but like quicksilver it has not been sent out of the kingdom. Tin has also been discovered in small quantities, and of a quality so fine and white that it almost equals silver, but of the extent of this mineral little is known, as the Japanese do not attach much value to it, and therefore have not sought for it. Iron is found in three of the provinces, and probably exists in others. The Japanese know how to reduce the ore, and the metal they obtain is of superior quality, of which they make steel unsurpassed in excellency. "They have no want of coals in Japan," says Kœmpfer, "they being dug up in great quantities in the province of Sikusen and in most of the northern provinces." Dr. Siebold also speaks of coal as being in common use throughout the country, and on visiting one of the mines he saw enough to convince him that it was skilfully worked. For domestic purposes they convert the coal into coke. Viewed in the light of commercial intercourse between the two hemispheres, this coal is worth more than all the metallic deposits we have enumerated.—In a region so volcanic, sulphur is, as might be expected, an abundant mineral. In some places it lies in broad deep beds, and may be dug up and removed with as much ease as sand. A considerable revenue is derived by the government from sulphur.—*American Expedition to Japan, p.* 76. On the island of Banca there are silver-mines, but the Sultan has a great objection to their being worked: there are silver mines too in the Kingdom of Ava. We also know this valuable metal to be a product of Siam, from which country it is occasionly brought to India as well as from Manilla and Batavia.—*Ainslie.* Crawfurd however says that no veins of this metal have hitherto been discovered in any of the islands of the Malay or Philippine Archipelagos, many of which contain such abundant stores of iron, gold, tin and antimony. A small quantity of it, however, appears to be contained in all the gold of these countries. In Malay the name for silver is perak, and in Javanese salaka. Both are native words of which the origin has not been traced.—*Crawfurd Dict. page* 395.

Silver was well known to the ancients, and is mentioned in the book of Job. It is the whitest of all the metals, and capable of receiving a lustre which is scarcely inferior to that of polished steel. In its polished state it reflects more light and heat than any other metal, so that it has a very low radiating power for heat, and hence a silver vessel retains the heat of the liquid contained in it longer than a vessel of any other metal. The preference given to a silver pot for making tea is founded on correct observation: a black earthen ware vessel is such a powerful radiator of heat, that a hot liquid contained in it rapidly declines in temperature, and if used for making tea the temperature of the boiling water soon falls below the point required for making the infusion. Silver ranks next to gold in ductility and malleability. Its density is 10·47: it is harder than gold and softer than copper, and, when pure, it is so soft as to be cut by a knife: the addition of a small quantity of copper increases its hardness: it fuses at a full-red heat, corresponding to 1,873° Fahr. Exposed to the heat of a blast furnace, silver throws off metallic vapours, and when fused between the charcoal electrodes of a powerful voltaic battery it is readily volatilized. There is a large demand for silver not only for the purposes of coinage, but also for services of plate, for which it is admirably adapted, inasmuch as it is not attacked in the slightest degree by any of the substances used for food. The large demand for the metal thus occasioned is met by its comparative abundance in the native state or alloyed with various other metals; it is also found mineralized by the non-metallic elements, and also in combination with certain acids. It is also obtained in large quantities from lead ores, as noticed under LEAD. One of the richest and most abundant ores of Chili is the *chloride*, where it is often accompanied by native silver. A large proportion of the silver of commerce is extracted from ores which are too poor to allow of their being smelted or fused, even supposing fuel were abundant in the neighbourhood of the mines, which is not the case. Recourse is therefore had to the process of *amalgamation* founded on the ready solubility of silver and many other metals in metallic mercury. The Saxon process as adopted at Freyberg differs somewhat from the American process.—*Tomlinson.*

Silver, has been well known and highly valued from the remotest period, a circumstance which is readily explained by the fact of its occurring frequently native, and possessing great lustre and fitness for immediate use without being subjected to any metallurgic process. Native Silver occurs crystallised, arborescent, or dendritic, capillary, reticulated, granular, and massive. The primary form of the crystal is a cube. It has no cleavage. Fracture hackly. Colour white, but externally often blackish, owing probably to the presence of a little sulphur. Hardness 2.5 to 3. Lustre metallic. Color pure white, except when tarnished. Streak shining. Opaque. Specific gravity 10.47. Malleable, but commonly less so than pure silver, probably owing to an admixture of other metals. Soluble in nitric acid, and the solution colourless when pure, but blue, if copper be present; and if antimony, a white substance; and if gold, a black one remains undissolved. Fuses into malleable globules before the blow-pipe. Native Silver is met with in most parts of the western world; in the British Isles, Germany, Hungary, in the north of Europe, but especially, and in largest quantity, in Mexico and South America. Silver occurs in mixture or combination with other metals. The ores from which the silver of commerce is mostly obtained are the Vitreous Silver, Brittle, or Black Silver-Ore, Red Silver-Ore, and Horn Silver, in addition to Native Silver. Besides these, silver is obtained in large quantities from galena (lead-ore), and from different ores of copper; and some galenas are so rich in silver that the lead is neglected for the more precious metal. This metal occurs in rocks of various ages, in gneiss, and allied rocks, in porphyry, trap, sandstone, limestone, and shales; and the sandstone, and shales may be as recent as the middle secondary, as is the case in Prussia. The silver-ores are associated often with ores of lead, zinc, copper, cobalt and antimony, and the usual gangue is calc spar or quartz, with frequently flour spar, pearl spar, or heavy spar. The Silver of South America is derived principally from the Horn Silver and Brittle Silver-Ores, including Arseniuretted Silver-Ore, Vitreous Silver-Ore, and Native Silver. Those of Mexico are of nearly the same character. Besides, there are earthy ores called Colorados, and in Peru, Pacos, which are mostl earthy oxides of iron, with a little disseminate silver; they are found near the surface, where th rock has undergone partial decomposition. Th sulphurets of lead, iron, and copper, of the min ing regions, generally contain silver, and are al so worked. (Dana). The principal mines o silver in Europe are those of Spain, of Konigsberg in Norway, of Saxony, the Hartz, Austria and Russia. In England, argentiferous galen is worked for its silver. Forty thousand tons c this ore were reduced in 1837, which containe upon an average about six ounces of silver in ton of lead. The annual product of the sever countries of Europe is thus estimated by Dan in his 'Manual of Mineralogy:'—

	Pounds Troy.
British Isles,	7,500
France,	4,150
Austria,	63,000
Sweden and Norway,	13,000
Spain,	130,000
Saxony, the Hartz, and other parts of Germany,	78,500
Belgium	440
Piedmont, Switzerland, and Saxony	1,560

making in all 298,150 troy pounds, or about 4,500,000 dollars annually. With the sum from Russia, about 730,000 dollars, it becomes 5,230,000 dollars a year. This is small compared with the amount from America, which at the beginning of the present century equalled 2,100,000 pounds, or 31½ millions of dollars, nearly six times the above sum; and it is probable that these mines will again yield this amount when properly worked. The whole sum from Russia, Europe, and America, makes nearly 2,000,000 pounds avoirdupois.—*Eng. Cyc.*

(7624) SIMARUBACEÆ, *Quassiads*, a natural order of Plants belonging to the Gynobasic group of Polypetalous Exogens. The plants of this order are trees or shrubs, with alternate exstipulate usually compound leaves, and mostly without dots. The flowers are whitish-green or purple, on axillary or terminal peduncles, hermaphrodite, or occasionally unisexal; the calyx is 4-5-parted; petals 4-5, twisted in æstivation; stamens twice as many as the petals, arising from the back of an hypogynous scale; ovary 4-5-lobed; style simple; stigma 4-5-lobed. Fruit a drupe. Seeds pendulous, exalbuminous, with a superior short radicle drawn back within thick cotyledons. With one exception, they are all natives of Africa, India, and tropical America.—*Eng. Cyc.*

(7625) SIMIADÆ, the name of a Quadrumanous family of Mammalian Animals. It embraces the most highly-developed forms of the Monkey, and the relations of this family might be more or less given under the following articles:—APE; ATELES; BABOON; CHEIROPODA CHIMPANZEE; HYLOBATES; LAGOTHRIX; MACACUS; MYCETES, NASALIS; ORANG-OUTAN; QUADRUMANA; SAKIS; SAPAJOUS; and SEMNOPITHECUS. These animals were known at a very early period. The Kophim of the Scriptures (1 Kings, x. 22; 2 Chron., ix. 21), the Ceph of the Ethiopians, the Keibi and Kubbi of the Persians, the κῆβοι of the Greeks, and Cephi of the Romans, were clearly Apes. They are to be traced in some of the earliest paintings of the Egyptians. (Rosellini, &c.) The Cephi exhibited by Pompey, (Pliny, 'Hist. Nat.,' viii. 19), as well as those shown by Cæsar, appear to have been Ethiopian apes; and in the Greek name inscribed near the Quadrumanous animals in the Prænestine pavement, the oriental origin of the word is apparent. It is remarkable that the name *Cebus* [SAPAJOUS] is applied by modern zoologists to a genus of monkeys which could not have been known to the ancients; for the *Cebi* of our present catalogues are exclusively American. The following is a definition of the family *Simiadæ*, which embraces the animals to which the term Ape is most properly applied. They are all of them inhabitants of the old world:—The nostrils are divided by a narrow septum; they possess opposable thumbs on their fore and hind feet; the callosites on the rump are generally naked. Some of the species only are furnished with cheek-pouches. They usually possess a tail. The dental formula is as follows:—

$$\text{Incisors}\ \frac{4}{4}\ \text{Canines},\ \frac{1-1}{1-1};\ \text{Premolar},\ \frac{2-2}{2-2};\ \text{Molars},\ \frac{3-3}{3-3};\ =32.$$

The following definition of the second family of the *Quadrumana*, the *Cebidæ*, will afford the means of contrasting the two families:—The *Cebidæ* are natives of America. The nostrils are separated by a broad septum; the thumbs are sometimes absent on the fore feet; callosities and cheek-pouches absent; the tail is always present, and sometimes prehensile. In the list of the specimens of *Mammalia* published by Dr. J. E. Gray, we find almost a complete representation of the Asiatic forms of this family. They are as follows:—

(7626) Chimpanzee (*Troglodytes niger*, Geoff; *Homo Troglodytes*, Linn). West Africa.

(7627) Orang-Outan, or Pongo (*Simia Satyrus*, Linn.; *S. Wurmbii*, *Kuhl*; *S Agrias*, Schreb.) Borneo. [ORANG-OUTAN.]

(7628) Siamang (*Siamanga Syndactyla*; *Simia Syndactyla*, Raffles, Horsf.) Java.

(7629) Hoolock (*Hylobates Hoolock*, Martin; *Simia Hoolock*, Harlan). [HYLOBATES.]

(7630) Oungka (*H. agilis*, F. Cuv.; *Simia Lar.*, Vigors and Horsfield; *Pithecus agilis*, Desm.). Himalaya and Malacca.

(7631) Gibbon (*H. Lar*; *Homo Lar*, Linn.; *S. longimana*, Schreb.). Malacca.

(7632) Silvery Gibbon, or Wou-Wou (*H. leuciscus* Kuhl; *Simia leucisca*, Schreb.). Malacca.

(7633) Kalasie (*Presbytes rubicunda*) Borneo.

(7634) Simpal (*P. melalophos*; *Simia melalophos*, Raffles). Sumatra.

(7635) Tianac (*P. flavimana*; *Semnopithecus flavimanus*, I. Geoff.). Sumatra.

(7636) Rufous Presbytis (*P. nobilis*, Gray *Semnopithecus melalophos*, Desm.). Himalaya.

(7637) Lutung (*P. Pyrrhus*). Java.

(7638) Chingkau (*P. cristata*; *Simia cristata*, Raffles) Java and Sumatra.

(7639) Dusky Presbytis (*P. obscura*). Singapoor.

(7640) Negro Presbytis (*P. maura*; *Simia maura*, Schreb. China.

(7641) Hooded Presbytis (*P. Jhonii*; *Simia Jhonii*, Fischer). India, Madras.

(7642) Hoonuman (*P. entellus*). Bombay and Nepaul.

(7643) Nestor (*P. cephalopterus*; *Cercopithicus cephalopterus*, Zimm.). Ceylon.

(7644) Zati, or Capped Macaque (*Macacus radiatus*, Desm.) India.

(7645) Munga, or Bonnet-Macaque (*M. Sinicus*, Desm.; *Simia Sinica*, Linn.) India.

(7646) Bruh (*M. nemestrinus*, Desm.; *Simia nemestrina*, Linnæus). Sumatra.

(7647) Macaque (*M. cynomolgus*, Desm.; *Simia cynomolgos*, Linn.) India, Sumatra.

(7648) Rhesus (*M. Rhesus*, Desm.; *Simia Rhesus*, Audeb.) India, Bengal.

(7649) Oinops (*M. Oinops*). Nepaul.

(7650) Brilliant Macaque (*M. speciosus*, F. Cuv.) Japan.

(7651) Black Macaque (*M. niger*, Bennett; *Cynocephalus niger*, Desm.). Philippines.

(7652) Wanderoo (*S. veler*; *Simia Silenus*, and *S. Veler*, Linnæus). Ceylon, China, India.

(7653) Gelada (*Gelada Ruppellii*). Abyssinia.

(7654) Tartarin (*Cynocephalus Hamadryas*, Latr: *Simia Hamadryas*, Linn.) Abyssinia.

The following forms of *Simiadæ* and *Cebidæ* were existing in the Gardens of the Zoological Society, Regent's Park, between the years 1847 and 1852:—

Simiadæ.

Simia Satyrus, *Hylobates Hoolook*, *Semnopithecus Gulellus*, *Cercopithecus nictitans*, *C. petaurista*, *C. melanogenys*, *C. cephus*, *C. albopilaris*, *C. Campbellii*, *C. Pluto*, *C. Mona*, *C. Pygerythrus*, *C. Sabæus*, *C. cynosurus*, *C. callithricus*, *C. Talaponi*, *C. niger*, *Cercocebus fuliginosus*, *C. Æthiops*, *Macacus sinicus*, *M. pileatus*, *M. cynomolgus*, *M. erythræus*, *M. nemæstrinus*, *M. Silenus*, *M. niger*, *Inuus sylvanus*, *Cynocephalus Hamadryas*, *C. Sphinx*, *C. Babouin*. *C. Porcarius*, *C. leucophæus*, *C. Mormon.*

Cebidæ.

Ateles Chamek, *A. paniscus*, *A. ater*, *A. Beelzebuth*, *A. marginatus*; *Pithecia chiropotes*; *Lagothrix Humboldtii*; *Brachyurus Ouakari*; *Saimiri sciureus*; *Callithrix torquatus*; *Nyctipithecus trivirgatus*; *Cebus apella*, *C. capucinus*, *C. cirrifer*, *C. xanthosternum*, *C. hypoleucus*; *Hapale Jacchus*, *H. aurita*, *H. penicillata*, *H. (Midas) Œdipus*, *H. (Midaz) rufimanus*, *H. (Midas) Tamarin.*

Fossil Simiadæ.—Remains of *Simiadæ* have been discovered and described from the tertiary formations of India, France, England, and Brazil. These fossils are illustrative of four of the existing types of quadrumanous or rather Simious forms. Thus we have *Semnopithecus* from India; *Hylobates* from the south of France; *Macacus* from Suffolk; and *Callithrix*, peculiar to America, found in Brazil. Nor is it unworthy of remark, that we here have evidence that so high a quadrumanous form as the Gibbon, a genus in which the skull is even more approximated to that of man than it is in the Chimpanzee, was living upon our globe with the Palæothere, Elephants, and other Pachyderms. We say that the skull of the Gibbon comes nearest to that of man, because, though the cranium of the young Chimpanzee approaches that of the human subject, it is far removed from it when the permanent teeth are developed. Teeth of *Macacus*, are the only remains of the *Quadrumana* which have been found in Britain. In other countries larger remains have been found. Thus, in 1836, Lieutenants Baker and Durand discovered, in the Sub-Himalayan Hills, near the Sutlej, an almost entire right superior maxillary bone, containing the five molar teeth and part of the canine. The strata in which this fossil was found was tertiary, and consisted of a mixed calcareous sandstone and clay. In the year following, Colonel Cautley and Dr. Falconer discovered in the same formation a considerable portion of the lower jaw, with all the molars of the right side, and a part of the teeth of the left side, together with two middle incisors and the right canine. These remains belonged to a species of *Semnopithecus*, which must have existed with the *Sivatherium* and *Hippopotamus*, whose remains were found in the same formation.—*Eng. Cyc.*

(7655) SIPHONOSTOMATA, M. De Blainville's name for his first family of Siphonobranchiate *Mollusca*. The forms comprised under this family are principally to be found under the extensive genus *Murex* of Linnæus. It is sometimes applied to several families forming a section of Prosobranchiated *Mollusca*. In Woodward's 'Manual' the following families are included:—

1. *Strombidæ*. [STROMBIDÆ.]
2. *Bucciniadæ*. [BUCCINUM.]
3. *Conidæ*. [CONIDÆ.]
4. *Volutidæ*. [VOLUTIDÆ.]
5. *Cypræidæ*. [CYPRÆIDÆ.]

All the known animals belonging to it are carnivorous and marine, and all are furnished with a horny operculum. The *Siphonostomata* are thus subdivided by M. De Blainville:—

Pleurotoma (Lam.)

(7656) *P. Babylonia.* The shell fusiform-turreted, transversely carinated and belted, white, with black-spotted belts, the spots quadrate; whorls convex; tube or canal rather long. It is found in the East Indian Seas and the Moluccas.

British Islands and Greenland... ...	17
Mediterranean	19
Africa	15
Red Sea and India	6
China	90
Australia	15
Western America	52
West Indies and Brazil	20

Fusus (Lam.).

(7657) *F. Colus* (*Murex Colus* Linn.) Shell fusiform, narrow, transversely furrowed, white, the apex and base rufous ; whorls convex, nodulously carinated in the middle ; canal long and slender ; the lip sulcated within, and denticulate on the margin. It is a native of the East Indian Ocean.

Pyrula (Lam.)

(7658) *P. carnaria* (*P. Vespertilio*, Lam. ; *Fusus carnarues*, Mart. ; *Murex Vespertilio*, Gm.) Shell subpyriform, thick, ponderous, muricated anteriorly, of a rufous-bay colour ; the last whorl crowned above with compressed tubercles ; spire rather prominent ; the sutures simple ; canal sulcated and subumbilicated. It is a native of the Indian Ocean.

(7659) *P. Spirillus*. Shell ventricose anteriorly the canal very long delicately striated transversely, white, spotted with saffron-colour ; body-whorl abbreviated ; carinated in the middle, flattened above, tuberculated below the middle ; spire very much depressed, its apex mamilliferous. It is a native of the East Indian Ocean and the coasts of Tranquebar.

(7660) *P. ficus*. Shell fig-shaped, delicately decussated, cœrulescent-gray ; sprinkled with variegated bay or violet spots ; transverse striæ the largest and most crowded ; the spire short, convex, mucronated at the centre ; mouth cœrulescent-violaceous generally. It is a native of the Indian Ocean and the Moluccas.

Pyrulæ have been found on mud, sandy muds, and sand, at depths ranging from the surface to nine fathoms. There are 59 recent species and 30 fossil. The recent are found in the West Indies, Ceylon, Australia, China, and West America. The fossil are found in the Neocomian beds of Europe, India, and Chile.

Fasciolaria (Lam.).

(7661) *F. Trapezium*. Shell fusiform, ventricose, tuberculiferous, rather smooth, white or rufescent, girt with rufous lines ; the tubercles conical, subcompressed, and in a single series in the middle of the whorls : columella reddish-yellow ; outer lip elegantly striated within, the striæ red. It is found in the East Indian Ocean.

(7662) *F. filamentosa*. Shell elongated, fusiform, turreted, transversely sulcated, white, painted with longitudinal orange-red stripes ; middle of the whorls subangulated, and the whorls themselves crowned with short and compressed tubercles ; the canal rather long ; the outer lip striated within. It is found in the East Indian seas.

Fasciolariæ have been found on muddy bottoms, at depths ranging from the surface to seven fathoms. There are 11 recent and 28 fossil species. The former are found in the West Indies, Mediterranean, West Africa, India, Australia, the South Pacific, and Western America. The latter are found in the Upper Chalk.

Turbinella (Lam).

(7663) *Turbinella Rapa*. Shell subfusiform, ventricose in the middle, thick, very ponderous, unarmed, white ; the whorls above covering the base of the preceding one ; canal rather short ; columella subquadriplicated. It is found in the East Indian Ocean.

(7664) *T. Scolymus*. Shell subfusiform, ventricose in the middle, tuberculated, pale yellow ; spire conical, tuberculato-nodose ; the last whorl crowned above with great tubercles ; canal transversely sulcated ; the columella orange-coloured and three-plaited. It is a native of the East Indian Ocean.

Turbinellæ have been found on bottoms of sandy mud, at depths varying from the surface to 18 fathoms. There are 70 recent species, chiefly tropical, and 20 fossil, from the Miocene Tertiary beds.

Triton (Lam.)

(7665) *Triton variegatus*, the Marine Trumpet, or Triton's Shell. Shell elongated conical, trumpet-shaped, ventricose below, girt with very obtuse smooth ribs, white, elegantly variegated with red and bay ; the sutures crisped at the margin ; the aperture red ; the columella wrinkled with white and with a single plait above ; the edge of the outer lip spotted with black, the spots bidentated with white. It is a native of the seas of the West Indies and the Asiatic seas, especially those of the torrid zone.

(7666) *Triton Lotorium*. Shell fusiform turreted, distorted below, very much tuberculated, transversely rugous, and striated, rufous ; the whorls above angulate tuberculated ; canal tortuous, the extremity recurved ; the aperture trigono-elongated and white ; the outer lip toothed within. It is a native of the East Indian Ocean.

(7667) *Triton Anus*, the Grimace. Shell ovate, ventricose-gibbous, distorted, flattened beneath ; nodulous above, subcancellated, white, spotted with rufous ; the aperture narrowed, sinuous, irregular, ringent ; the lip very much toothed ; the canal short and recurved. It is found in the East Indian seas. Tritons have been found on various bottoms at depths ranging from the surface to 30 fathoms.

(7668) *Ranella* (Lam.).—Shell oval or oblong, depressed, having only two varices situated latterally ; aperture oval ; canal short, and a sinuous at the union of the two lips, backwards.

(Genus *Bufo*, De Montfort).

(7669) *R. granulata*, a native of the East Indian Ocean.

(7670) *R. foliata*, found in the vicinity of Mauritius.

Ranellæ have been taken on different bottoms at depths varying from the surface to 20 fathoms.

Fifty recent and 23 fossil species have been described.

Murex. (Linn.).

(7671) *Murex Tribulus*, Linn. (*Murex tenuispina*, Lam).—Shell ventricose anteriorly, the tube very long, elegantly spired throughout its length, the spires set in triple order, each row at regular intervals, grayish or purplish gray, the spires very long, thin, rather closely set and somewhat hooked; body of the shell transversely sulcated and striated; the spire prominent. It is a native of the Indian Ocean and the Moluccas. This is the Venus's Comb of collectors, and when perfect is a most delicate and striking shell.

(7672) *M. haustellum* (Snipe's or Woodcock's Head of collectors) .Shell anteriorly ventricose, naked, scarcely armed, fulvous inclining to red, lineated with bay; body of the shell rounded and furnished with three or more ribs between the varices; the tube very long and slender; the spire short; mouth rounded, red. It is a native of the East Indian Ocean and the Moluccas.

(7673) *M. acanthopterus.* Shell oblong, fusiform, trialated, transversely sulcated and striated, white; the alæ membranaceous; whorls angulated; aperture ovate rounded. It is a native of the East Indian Seas.

(7674) *M. adustus.* It is a native of the East Indian Ocean.

(7675) SINAPIS, the name of a genus of Plants belonging to the natural order *Cruciferæ*, or *Brassicaceæ.* All the species are known by the name of Mustard, a word derived from *Mustum ardens*, in allusion to their hot and biting character. The genus is known by its siliquose fruit, which is rather terete, with nerved valves; small short acute style; sub-globose seeds disposed in one row in each cell, and spreading calyx. The leaves are of various forms, lyrate or deeply toothed; the flowers yellow, arranged on terminal bractless racemes; they are chiefly natives of the temperate parts of both hemispheres of the Old World. Between 40 and 50 species of this genus are enumerated. Of these, two species are well known and much cultivated in this country, *S. nigra* and *S. alba*, the Black and White Mustard.—*Eng. Cyc.* Five or six species of Sinapis are cultivated in all parts of India, for the sake of the valuable oil they yield, those most frequently seen are *S. glauca*, *toria* and *racemosa.*—*M. E. J. R.*

(7676) SINAPIS ALBA. The seeds of the "sinapis alba" yield by expression 36 per cent of a bright yellow, pleasant tasted, edible oil, having a strong smell, and slight taste of mustard. The seeds of "sinapis nigra," yield only 28 per cent of an oil in all respects similar to the above. The average price of mustard seed in eighteen large stations, in all parts of the Madras Presidency, for the Quarter ending 31st October 1854, was Rs. 1 2 8 per maund of 25lbs., the maximum being Rs. 1 11 6 at Cannanore and the minimum As. 15 5 at Nagpore. In Vizagapatam it costs Rs. 268 per Sicca garce. The oil is not exported from Madras, but the seeds have been shipped as follows:

In the years	1847-48	……	Cwt.	5,828
,,	1848-49	……	,,	6,767
,,	1849-50	……	,,	9,435
,,	1850-51	……	,,	9,909
,,	1851-52	……	,,	3,636
,,	1852-53	……	,,	16,075

—*M. E. J. R.*

The Mustard plant is officinal on account of its seeds, or rather of the flour of these seeds, so well known as a condiment by the name of Mustard. But Dr. Pereira learnt that the best flour of Mustard is prepared by crushing the seeds of both Black and White Mustard between rollers, and then pounding them in mortars, when they are twice sifted to yield *pure flour of Mustard.* Dr. Christison's information confirms that of Dr. Pereira, that common flour of Mustard is adulterated, partly on account of the pungency of Black Mustard seed. "Two bushels of black, and three of white seed yield, when ground, 145 pounds of flour; which, to diminish the pungency and improve the colour, is mixed with 56 pounds of wheat flour and two pounds of turmeric; and the acrimony is retored without the pungency, by the addition of a pound of (capsicum) chilly pods, and half a pound of ginger." (c) Dr. Thomson says he could detect no turmeric, nor cayenne pepper in the specimen which he examined. The *pure flour* of Mustard ought alone to be used officinally. Though Black and White Mustard have both been minutely examined by several chemists, they still require further investigation. The former contains a Fixed Oil, Gummy matter, Sugar, a Colouring and a Peculiar green matter, a Fatty pearly matter; *Myronic acid* in combination with Potash, or Myronate of Potash (the Sulpho-Sinapisin of Henry and Garot) *Myrosyne*, *Sinapisin*, and some salts.—*Royle.*

The oil.

Mustard Oil, Eng.
Avaloo and Sursava noona, Tel.
Sarshapatailum, Sans.

Kadaghoo yennai, Tam.
Raee ka tael, Hind.
Rai ka tael, Guz.

This valuable oil, although seldom sold in the Market, being only made when required, is used in most parts of India in cookery, and is considered superior to all other oils for anointing the body, which it is supposed to invigorate. In medicine, it is sometimes given internally, but is more frequently applied as a rubifacient.—*M. E. J. R.* Common Mustard consists of the flour of the seeds of the Black Mustard, though generally mixed with that procured from the seeds of the White Mustard, or Sinapis alba, and deprived of fixed oil by expression. Both species have been long used in medicine, being the ναπυ of Hippocrates, and the Sinapi of the Romans.—*Royle.* The botanical description *of Sinapis alba, or* "White Mustard." would be Siliques hispid, spreading, rather narrower than the ensiform beak; leaves lyrate, smoothish; stem smooth. It is a native of Great Britain and most countries in the south of Europe. It is frequently cultivated, and when young is eaten as a salad. —*Eng. Cyc.*

(7677) SINAPIS CHINENSIS. Mustard Seed. Lin.

Kadaghoo, Tam.
Rai, Guz.
Raina, Duk.
Rai, Hind.
Khirdull, Arab.
Sasavee, Malay.
Tukhm-i sipeedan, Pers.
Rajaca, Sans.
Avaloo, Tel.

Ainslie's Mat Med. p. 264.

(7678) SINAPIS DICHOTOMA, or Mustard.

Moung-ngyeen, Burm.

This is cultivated in small quantity in the Tounghoo district.—*McClelland.*

(7679) SINAPIS NIGRA, Black Mustard, is known by its smooth, even, somewhat tetragonal siliques closely pressed to the peduncle; lyrate ower leaves, and lanceolate upper leaves. It is found in cultivated fields, waste grounds, and roadsides throughout Europe. The black Musard is indigenous in almost every part of Europe. The root is thick and fleshy, the stem about 2 to 3 or 4 feet high, hispid below, with smooth round branches above. Lower leaves large, rough, lyrate, variously lobed and toothed; upper ones narrow, lanceolate, smooth, dependent. Calyx yellowish, equal at base, spreading. Petals obovate, yellow, spreading. Silique small, erect, or placed close to the stem, obtusely quadrangular, nearly even and smooth, tipped by a hort quadrangular style, but without the proper, often seed-bearing beak of the genus; the valves onvex, with one straight dorsal nerve, and a ew lateral anastomosing veins. Seeds numerous, n a single row, small, round, blackish brown. Fig. 41.—E. B. t. 969.

(7680) SINAPIS TRILOCULARIS. Mustard.

Rai, Duk.

(7681) SINGHARA. This is the spinous ruit of Trapa bispinosa &c. The plant furnishing his important article of food appears to have been extirpated from the tanks of southern ndia, while it has been still preserved in the Mahratta Country and Deccan.—*M. E. J. R.* There are more than one species which produce he Singhara or Water Nuts. The large seeds of *Trapa bicornis*, a native of China, and of *T. ispinosa* and *natans*, species indigenous to India, re sweet and eatable, and the aquatic plants which furnish them are hence an extensive article of cultivation. In Cashmere and other parts of the East they are common food, and known under the name of Singhara nuts. In Cashmere the government obtains from these nuts £12,000 of annual revenue. Mr. Moorcroft mentions that Runjeet Sing derived nearly the same sum. From 96,000 to 128,000 loads of this nut are yielded annually by the lake of Ooller alone. The nut abounds in fecula. In China the kernel is used as an article of food, being roasted or boiled like the potato. The seeds of various species of *Nelumbium*, natives of the East Indies, Jamaica, and the United States, also form articles of food. The fruit of *N. speciosum* is supposed to be the Egyptian bean of Pythagoras. The petioles and peduncles contain numerous spiral vessels, which have been used for wicks of candles. The fruit of *Willughbeia edulis*, a native of the East, as its name implies, is eatable. The kernel of the mango can be reduced to an excellent flour for making bread.—*Simmonds.*

(7682) SIPHOCAMPYLOS. *Lobeliaceæ.*—These are small pretty shrubs growing well in a light sandy soil, and are propagated by seed and cuttings.—*Riddell.*

(7683) SIPHONANTHUS FRAGRANS.

Hatti-kana, Duk.

Double variety. A native of China.—*Riddell.*

(7684) SIPHONANTHUS INDICA. *Verbenaceæ.*

Burungee, Duk.

A tall, erect growing, suffruticose plant, with linear leaves; flowers white or cream coloured, with long tubes.—*Riddell.*

(7685) SIPHONIA, a genus of Plants belonging to the natural order *Euphorbiaceæ*, consisting of two species, but one may be only a variety of the other. This is celebrated as being the tree which yields the large quantities of caoutchouc, called cahuchu by the native Americans, annually imported from Para in South America.—*Eng. Cyc.*

(7686) SIPHONIA ELASTICA is a tree 50 to 60 feet in height, common in the forests of Guiana and Brazil, and which has been introduced into the West Indies. Condamine frequently mentions it in his voyage down the Amazon. Caoutchouc is the milky juice of the plant, which exudes on incisions being made and solidifies on exposuore to the air. [India Rubber.]—*Eng. Cyc.*

(7687) SISON, a genus of Plants belonging to the natural order *Umbelliferæ.* It possesses the following characters:—calyx obsolete; petals broadly obcordate, deeply notched, and curved with an inflexed point; styles very short; fruit ovate, laterally compressed; carpels with five filiform equal ridges, of which the lateral ones are marginal; interstices with single short club-shaped vittæ; seed gibbous, convex, plane in front; universal and partial involucre of few leaves.—*Eng. Cyc.*

(7688) SISSOO, (Dalbergia Sissoo,) is one of the most valuable of the timber-trees of India, and with the Saul, is more extensively employed than any other in north-west India. The ship-builders in Bengal select it for their crooked timbers and knees; it is remarkably strong, its colour is a light greyish brown, with darker coloured veins. "In structure it somewhat resembles the finer species of teak, but it is tougher and more elastic." There are two kinds used respectively in Bengal and Bombay, the latter is much darker in colour. The Indian black rose-wood, (Dalbergia latifolia,) is a superior species of Sissoo, from the Malabar-coast.—*Hott.*

(7689) SITANUK. One valve of a muscle shell, with the dried fish attached. The punsaris call it "the small head of a sea animal:" used in Ajmere as an aphrodisiac, and also said to cure the cynanche of children: comes from Bombay via Pali: one seer costs two rupees.—*Genl. Med. Top. p.* 132.

(7690) SIVATHERIUM (from Siva, an Indian deity), a genus of extinct animals belonging to the family *Elephantidæ*. The remains of species of this remarkable genus were found by Dr. Falconer and Colonel Cautley in the valley of Mackanda, in the Sewalik Hills of the Himalaya. Two species of this genus, *S. giganteum* and *S. Perimense,* have been described. A cranium, lower jaw and teeth, and bones of the extremities of *S. giganteum* are now in the British Museum. The skull of this animal is nearly as long as that of the Elephant, the neck was shorter and stronger than in the Giraffe. The posterior portion of the skull is greatly developed, and formed of cellular cavities, as in the Elephant. "The face is short, and the nasal bones are remarkable for the manner in which they are prolonged into a pointed arch above the external nostrils. indicating a trunk, or proboscis. The very inclined direction of the front of the face in relation to the triturating surface of the teeth imparts a physiognomy altogether peculiar. Two horns arise from the brow between the orbits, and diverge from each other, and it is probably that the posterior protuberances of the forehead also supported a pair of short massive horns." (Mantell.) When living, the Sivatherium must have resembled an immense Gnu, or Antelope, with a short thick head surmounted with two pairs of horns. The front pair of these horns were small, whilst those behind were probably palmated. The eyes were small, and it had a nasal proboscis, an organ unknown amongst the *Ruminantia*. (Mantell, *Petrefactions and their Teachings*; *Journal of the Asiatic Society*.).—*Eng. Cyc.*

(7691) SIZE.

Sirrus. Guz.; Sirisht, Hind. Glue.

A gelatinous substance, obtained from parchment shavings, fish skin, and several animal membranes. It is less adhesive than glue, and is used by book-binders, paper-hangers, and painters. (*Waterston.*)—*Faulkner.*

(7692) SKIMMIA LAUREALA. This plant has been lately introduced into English gardens, from the northwest Himalaya, and is greatly admired for its aromatic, evergreen foliage, and clusters of scarlet berries. It is a curious fact, that this plant never bears scarlet berries in Sikkim, apparently owing to the want of sun; the fruit ripens, but is of a greenish-red or purplish colour.—*Hooker, Him. Jour. Vol.* 1, *p.* 187.

(7693) SKIMMIA REEVESIANA. On the same stage, Fortune says, with this Azalea I observed a fine new shrub, which I mistook for a holly. It turned out to be a species of *Skimmia*, and I observed that Dr. Lindley has described it as *Skimmia japonica.* It is however quite a different plant from that known by the name in the gardens of England, and I propose to call it *Skimmia Reevesiana.* —*Fortune's Tea Districts, page* 329.

(7694) SKINS.

Peaux, Fr.
Felle, Ger.
Chamro, Guz.
Chumra, Hind.
Pelli, It.
Churm, Pers.
Pelles, Port.
Pieles, Sp.

This term is applied in commercial language to the skins of those animals, as calves, deer, goats, lambs, &c. which, when prepared, are used in the lighter works of book binding, the manufacture of gloves, parchment, &c; while the term hides, is applied to the skins of the ox, horse, &c., which, when tanned, are used in the manufacture of shoes, harness, &c. (*McCulloch.*) Salted and tanned hides, and also sheep and goat skins, are exported from Bombay to London and Liverpool.—*Faulkner.*

(7695) SLATE (Roof).

Ardoise, Fr.
Schiefer, Ger.
Lavagna, Lastra, It.
Pizarra. Sp.

A laminated stony substance, of which there are many kinds; though the only one of commercial importance is *clay slate,* employed for roofing. The principal slate quarries in Britain, are in Wales, Cumberland, and Scotland.—*Faulkner.*

(7696) SLIPPER PLANT. Euphorbia Tithymaloides.

(7697) SMALTE.

Smalte Dut.
Smalt, Fr.
Smalto azzurro, Smaltino, It.
Schmalz, Ger.
Lasor, Rus.
Esmalte. Azul-azur, Sp.

An oxide of cobalt, melted with siliceous earth and potash. It is sort of glass, of a beautiful deep blue colour; and being ground very fine, is known by the name of azure or powder blue. It is in great demand for the painting of earthenware, in the colouring of paper, and for other purposes in the arts. Smalt is principally manufactured in Germany and Norway.—*Faulkner*. The Chinese use it for painting on porcelain and glazed copper vessels ; the consumption, which was never very great, has fallen off, and the price declined the last few years.—*Morrison*.

(7698) SMILACEÆ, *Sarsaparillas*, a small natural order of Plants belonging to Lindley's class of Dictyogens. There has been much difference of opinion amongst botanists with regard o the position of *Smilax* in the natural system, as well as the number of genera that ought to be admitted into the order *Smilaceæ*. Lindley has placed two genera, *Smilax* and *Ripogonum*, in his order, which possess the following characers : — Flowers hermaphrodite or diœcious ; cayx and corolla confounded, inferior 6-parted ; tamens 6, inserted into the perianth near the base, seldom hypogynous ; ovary 3-celled, the cells, 1- or many-seeded ; style usually trifid ; tigmas 3 ; fruit a roundish berry ; albumen beween fleshy and cartilaginous ; embryo usually istant from the hilum. They are mostly herbaceous plants, with a woody stem, and a tenency to climb. Their leaves are reticulated. This last character separates the order from *Liliaceæ* and its allied orders, with which it otherwise closely agrees. *Smilax* is found in most parts of the world, especially in Asia and America. [SMILAX].—*Eng. Cyc.*

(7699) SMILACINA, is a potherb growing in Thibet, North of *Kinchinjunga*, to which Dr Hooker was afterwards more indebted than ny. This beautiful *plant*, grows from two to five feet high, and has plaited leaves and crowded paicles of white bell-shaped flowers, like those of s ally the lily of the valley, which it also resemles in its mucilaginous properties. It is called Choklibi” and its young flower-heads, sheathd in tender green leaves, form an excellent veetable.—*Hooker*, *Him Jour. Vol.* II. *page* 47.

(7700) SMILAX, a genus of Plants which ives its name to the natural order *Smilaceæ*. The name occurs in Greek authors, as Theophrasus and Dioscorides, and is applied to several ifferent kinds of plants, as the yew-tree ; a speies of Phaseolus or Convolvulus (Σμίλαξ τραχεῖα) as *Smilax aspera*, which belongs to the present enus. *Smilax*, is characterised by having a -leaved corol-like perianth, with six stamens inserted into their base ; the anthers are linear nd fixed by the base ; ovary 3-celled ; ovules olitary, in each cell affixed to the apex ; style ery short ; stigmas 3, spreading ; berry 1-3-celld, 1-3-seeded ; seeds globular ; testa membraaceous, whitish ; hilum large and coloured ; lbumen cartilaginous ; embryo very small, remote from the hilum. The species form evergreen limbing shrubs, of which a few are found in temperate, but the majority in warm and tropical reions of both hemispheres, extending south to Australia, and north to Japan, North America, and the south of Europe. The species have fibrous or tuberous roots, stem often prickly ; leaves alternate, petiolate ; cordate or hastate, nerved, reticulate, venose, conchiferous stipules between the petioles ; flowers sessile on a globular receptacle ; subcapital pediculate and umbellate. Though the original species (*S. aspera*) of this genus is an inhabitant of the south of Europe, those now most celebrated for yielding the different kinds of Sarza or Sarsaparilla are natives of South America. But *S. aspera* still continues to be employed for medicinal purposes in the south of Europe, where it is called *Sarsaparilla Italica*, but there is no truth in the statement of its being the plant yielding Indian Sarsaparilla, which is *Hemidesmus Indicus*. Another celebrated species is the *Smilax China*, which has a tuberous root abounding in fecula, and therefore probably useful as a demulcent, though the Chinese esteem it invigorating, and ascribe to it other virtues. It is remarkable that two Indian species, which, like the Chinese species, have tuberous roots, should be called in Silhet Hurina-Shook-China and Gootea shook-China. These are *Smilax glabra* and *S. lanceæfolia*, and their roots cannot be distinguished from the China root, or *Chob-chinee*, as it is called in India. A similar species is common in the southern parts of North America, and has been called *Smilax Pseudo-China*, though there is reason to believe that more than one species may be confounded under this name. *S. glycyphylla* is an Australian species, which has received its specific name from the sweetish taste of its leaves, and has been called Sweet Tea from its employment in the form of infusion, and is probably alterative and diaphoretic, as well as slightly tonic. It is probable that some of the species found in the Old World will be discovered to be possessed of virtues equal to the American species. Some of the Indian species were sent some years ago by Dr. Gibson, superintendent of the East India Company's botanic garden near Poonah, to the Medical Board of Bombay, for trial in the hospitals of that presidency. [See SARSPARILLA.].—*Eng. Cyc.* Dr. Wight gives Smilax maculata, 2059 ; ovalfolia, 809 ; and Zeylanica, 2057-58.

Together with these we may notice, *S. Roxburghiana*, *Vern.* “Koomare shook China,” and *S. oxyphylla. Vern.* “Chotee or small koomaree ;” *S. rigida* and *ferox*, are Nipalese species. *S. elegans*, extends to the Deyra Doon, and *S. maculata* is found in Nepal, Kemaon, and Missouree. *S. prolifera* occurs very generally, and *S. Villandia* on the Morung hills.—(*Royle*). *O'Shaughnessy, p.* 645.

Mr. Royle also mentions a root sold in the bazars under the name of *Ashoba mugrabee*. This is translated sarsaparilla in Dictionaries, and the root much resembles that drug. Its origin is unknown.

Roxburgh states that the natives of India use the roots of the *S. glabra* in venereal and leprous ulcers, and that they also employ the *S. lanceæfolia* very extensively for the same purpose, and in the treatment of rheumatism.

Both these species deserve attentive examination. It seems however that the Ununtamol (*Hemidesmus indicus*) is likely to supersede all the varieties of sarsaparilla not only in Indian but in European practice.—*O'Shaughnessy, pages* 645 *and* 646.

(7701) SMILAX CHINA.

The roots.

Shookchina, BENG. | Chob Chinee, HIND.

Wild in China; the rhizome is hard, large, woody, knotty, brown or blackish externally, white in substance. The root is one of the China roots of the bazars, it is much, and we believe advantageously, employed as a substitute for sarsaparilla. It is largely imported into Calcutta from the Eastward, and much employed by native practitioners.—*O'Shaughnessy, p.* 645. The China root which comes to Ajmere via Bombay: is a largish, insipid, whitish root, in slices: taken as restorative and aphrodisiac in milk, one tola is a dose: used also in mesalihs: one seer costs two rupees. Natives suppose that this is the root of the "hazari," marygold (Tagetes erecta), after being in the ground three years.—*Gen. Med. Top. p.* 131.

(7702) SMILAX GLABRA.

Gooteea shook China, BENG.

A native of Sylhet and the adjacent country. A climber with a large tuberous rhizome. The stem and branches are thornless, leaves lanceolate, pointed, pale green beneath. Flowers umbellate, axillary, sessile and solitary. The root is identical in appearance with the China root of commerce.—*O'Shaughnessy, page* 645.

(7703) SMILAX LANCEÆFOLIA. EASTERN BENGAL.

Hurria shook China, BENG.

Much resembles the former, the leaves are lance shaped and three-nerved, umbels stalked —*O'Shaughnessy.*

(7704) SMILAX OVALIFOLIA. WILD SARSAPARILLA. There or two are more species of smilax in Tenasserim jungles, one of which is used by the natives as medicine, to supply the place of a species of sarsaparilla, whose dried roots are sold in the bazars.—*Mason.* Smilax ovalifolia is indigenous at Dapoorie, and possesses perhaps the virtues of the genuine Sarsaparilla.—*Spry's Suggest. p.* 68.

(7705) SMUT OR DUST BRAND, (Uredo Segetum) is a disease produced in wheat by a fungus, and is said to infect chaff, straw, seeds and leaves.—*Hassell.*

(7706) SNAKE FRUIT. ELEAGNUS CONFERTA.

(7707) SNAKE GOURD. TRICHOSANTHES ANGUINA. A curious contorted gourd, peculiar to India, is in very general demand for vegetable curries. The plant is of easy culture on trellises around the doors of the native cabins, and the fruit often grows two feet long, beautifully striped, small, and tapering, so that streaming down from the trellis, they immediately remind one of striped snakes suspended from the foliage of trees.—*Mason.*

(7708) SNAKES HEAD LILY.—AMARYLLIS FRITTILARIA.

(7709) SNAKE-WOOD, LETTER OR SPECKLED WOOD. A wood bearing this name is used at Demerara, Surinam, and along the banks of the Orinoko, for the bows of the Indians. The colour of the wood is red hazle, with numerous black spots and marks, which have been tortured into the resemblance of letters, or of the scales of the reptile; when fine it is very beautiful, but it is scarce in England, and chiefly used for walking sticks, which are expensive; the pieces that are from 2 to 6 inch diameter, are said to be the produce of large trees, from three to four times those diameters, the remainder being sap. Dr. Bancroft says, "*Bourra courra,* as it is called by the Indians, by the French bois du lettre, and by the Dutch Lettre hout, is the heart of a tree growing 30 feet in height with many branches," &c.

Cunjica paise, No. 64, in Mr. Morney's collection of Brazilian woods, is somewhat like snakewood, but less beautiful; it is much less red, and the marks are paler and larger. If not an accidental variety, the wood would be worth seeking.

The above must not be confounded with the snake-wood of the West Indies and South America, the Cecropia, of which there are three species all furnishing trees of straight and tall growth, and a wood of very light structure, presenting sometimes distinct and hollow cells. The Balsas, or floats, used by the Indians of South America for fishing, &c. are very commonly constructed of this wood.—*Holtzappfell.*

(7710) SNOW, RED. The valley, says Hooker, remains almost level for several miles, the road continuing along the east bank of the Lachen. Shoots of stones descend from the ravines, all of a white fine-grained granite, stained red with a minute conferva, which has been taken by Himalayan travellers for red snow; a phenomenon Dr. Hooker never saw in Sikkim. Red snow was never found in the Antarctic regions during Sir James Ross's South Polar voyage; nor does Dr. Hooker know any authentic record of its having been seen in the Himalaya.—*Hooker, Him. Jour. Vol* II. *page* 118.

(7711) SNUFF.

abac en poudre, Fr.
chnupftaback, Ger.
ass, Guz. Hind.
Tabacco da naso. It.
Nosowoi tabak, Rus.
Tabaco de plolvo, Sp.

Is tobacco in a powdered state, and in general se as an errhine. Other articles are sometimes lded to vary its pungency, scent, &c.—*Faulkner*.

(7712) SOAP.

Saboon. Arab.
Zeep Dut.
Savon, Fr.
Seife, Ger.
Saboon. Guz. Hind.
Sapone, It.
Sapo, Lat.
Saboon, Sujah, Mal.
Sabao, Port.
Mulo Rus.
Jabon, Sp.
Natsowcaram, Tam.

The manufacture of Soap was known to ie Romans, and has long been practised in India. lard or Castile soap is made by beating together ive oil and a solution of caustic soda. Chemists onceive that at the time when soap is formed, ie Elaine and the Margarine are, by a re-arngement of their elements, converted into two cids, called Elaic and Margaric acids, and that iese combine with the Soda forming Eleates and [argarates of Soda. But with the formation of ie acids, a new substance, *Glycerine*, is also prouced, and becomes dissolved in the water which rms one of the constituents of Soap. Some oils id animal fats contain Stearine, a substance close- allied to Margarine : in that case some Stearic cid is also formed. All Soaps are slightly alkane, feel soft and slippery, and are detergent. he watery solution is readily decomposed by cids, also by earthy and many metallic salts, ence, when water holds any of them in solution istead of dissolving, the soap becomes decomosed. Such waters are called *hard*, while those hich are comparatively pure are called *soft* aters. Castile Soap is composed of 9. to 10·5 f Soda, 76·5 to 75·2 of Oleic and Margaric cids, and of 14·3 to 14·5 of water, (*Ure*). Comion Soap made of Tallow and Soda, and Yelw Soap of Tallow, Resin, and soda, are not so ell adapted for medical use.—*Royle*.

Soap seems to have been introduced by the lahomedans into India, though the Hindoos have ng used alkaline leys, obtained from the ashes f plants, for many of the purposes of soap; and ley have a substitute for soap in several berries. oap is made at Dacca, of shell lime, 10 mds.; *jie muttee*, 16 mds.; common salt, 15 mds.; esamum oil, 12 mds.; goat's suet, 15 seers. It made of good quality at Saharunpore; and ome marine soap, of excellent quality though in mall quantity, was sent to the Exhibition of 851 from Calicut.—*Royle Arts &c. of India, p.* 84. Soap is an article of which a considerable uantity is made at Dacca. It is considered the est in India; and like the Soap of Tranquebar, hich is also of an excellent quality, it was formerly an export to the Mauritius, Penang, Sunatra, and the Islands of the Indian Archipelago. t is made of sajee mathee (impure carbonate of soda) sesamum oil, common salt, fine shell lime, and goat's suet. The manufacture of this article is carried on by Mahomedans, by whom it appears to have been introduced into India. The Arabic word *saboon* indeed, is the origin of the names given to soap in many countries, as that of *sabun* in the Crimea, and *savum* at Genoa. (See Dr. Clarke's Travels in Russia, and on the Don.) *Dr. Taylor.* At the Madras Exhibition of 1855, several samples of soap were exhibited and carefully examined by Mr. Stanborough. The best appeared to be a cake of castor oil soap, exhibited by Dr. G. W. Flynn, for which the Jury awarded a 2nd Class Medal.—*M.E.J.R.*

(7713) SOAP ACACIA. Acacia Rugata, Buch. The dried pods of this plant are sold in the Bazars of the Tenasserim provinces, and used as a substitute for soap in cleansing the hair. —*Mason.*

(7714) SOAP NUTS.]

Reeta, Areetah, Duk. Guz. Hind.
Rarak, Mal.
Bindake-i-hindee, Pers.
Arishta, Phenila, Sans.
Poovandie cottay Manay poongung kai. Tam.
Koomutti ghenzaloo, Tel.

These capsules, which contain black seeds, have a singular sweetish bitter taste, and a smell not unlike that of an over-ripe mango. They are used medicinally by native practitioners; and form, when bruised and agitated in water, a kind of sud like that of common soap, which is extensively used by the natives in India for washing their heads; and by washermen for cleaning silks. The pounded seeds are said to be a valuable remedy for epileptic paroxysms, and other diseases. Soap nuts are procurable in most bazars.—*Faulkner.*

(7715) SOAP-NUT OIL—Sapindus emarginatus.

Poovandie cottay, or Poongum-kai yennai, Tam.
Koocoodie noona, Tel.
Reethay ka tael, Hind.

This semi-solid oil is used medicinally by the natives, and is extracted from the kernel of the Soap-nut. Its cost prevents its general use. Excellent specimens are shown by the Trichinopoly Local Committee, and Lieut. Hawkes, also fair samples from Tanjore and the Madras Tariff.—*M. E. J. R.*

(7716) SOAP NUT TREE, Sapindus emarginatus.

Poochee-cottay, Tam. | Reethay ka jhar, Hind.

A tree met with about villages all over the country. The fruit used as indicated by the native name and sold in all bazars. Wood white, only used for fuel. In many situations, this tree yields a more profitable return than any other fruit tree. Wight No. 75, Hort. Garden. —*M E. J. R. The Soap Nut Tree.* These trees are very common in the Deccan villages. The leaves have a shining appearance, and the flower stalk a soft brown downy look, bearing a small whitish flower. The berries are used for washing by the natives.

Resembles the S. Indicus. The seeds are used medicinally, and also for washing the finer kinds of silk.—*Riddell.*

(7717) SOAP, SOFT, as used in the arts, is made with Caustic Potash and Fish-Oil and Tallow; is semitransparent, of the consistence of honey, brownish-coloured, and nauseous. But that referred to by the Colleges as made with Potash and Olive Oil, Dr. Pereira was unable to meet with, and found on inquiry that common Soft Soap is usually substituted in making *Ung. Sulphuris Comp.*—*Royle.*

(7718) SOAPSTONE, Steatite.

Sunkjeeroo. Hind. Guz. | Bulpum. Tam. Tel

This mineral has a soft and greasy feel; is of a yellowish white or greenish gray colour; sometimes spotted or veined; with little lustre or transparency. It is composed of silica, magne-alumina, oxide of iron, and water, in various proportions, according to the variety and the place whence obtained. It occurs at the Lizard Point in Cornwall; and is used for porcelain manufactures.—*Eng. Cyc.* Soapstone is met with in India, where it is known by the name of *Sunkjeeroo.* also *Bulpum.*—*Faulkner.* Soapstone, potstone, or steatite, is constantly for sale in the stalls, in Tenasserim, being used by the Burmese to write with on their black boards, as Europeans use chalk. It is not however a production of the Provinces but is imported from Burmah, where it is abundant.—*Mason.*

(7719) SOAP WORTS; Soap-fruits and Soap-nuts in tropical climates furnish substitutes for soaps, of a more or less useful character. Several of them are well known in Eastern Countries, and the dried berries of the Soap-worts, to which the genus Sapindus belongs, are to be found in almost every bazar, being used throughout India for special purposes, such as in washing silk, or hair, or woollens and cloths of various kinds.

In the W. Indies and the continent of America, *Sapindus saponaria* yields the so called soap berries, and, in Java, *Sapindus Rarak*: In India, several species, as *Sapindus Laurifolius, Sapindus acuminatus, Sapindus emarginatus, and Sapindus detergens*, yield berries, used as above. The fleshy part of these sapindus berries is viscid, and when dry and rubbed with water, they form a lather like soap, and the bark and roots have similar properties, though it is said that articles washed by the root and bark rapidly corrode. Hindoo physicians deem the *endocarp* a useful expectorant, and it is said the seeds, pounded with water and a small quantity put into the patient's mouth, often put an end to the epileptic paroxysm. The tincture or extract, of the Soapy matter of the Capsules of saponaria has been used in chlorosis. The berries, which are about the size of cherries, inclose black shining nuts which take a fine polish, and were formerly much used in England for making bottons after having been tipped with gold, silver or other metal. They are also, made into beads, necklaces &c. The kernel contains an edible oil, which is sometimes used for burning. In India the nuts of the *Rheeta, S. emarginatus*, are eaten by young people, and in the West Indies, the fruits of S. Senegalensis and S. esculentus are deemed as palatable as the hazel nut and almond. The *Sapindus* genus gives its name to the *Sapindaceæ*, the national order, to which it belongs. S. rubiginosus is a close-grained, hard wood, and forms an excellent timber. *Saponaria vaccaria*, is well known in India, and is identical in its properties with S. officinalis, a decoction of the root, frothing like a solution of soap.—*Kritz, kris, or kreess*, the root of some parisitical plant, but of unknown origin, is used in Cashmere to wash the shawls, soap being used only for the white shawls: It is used also medicinally, and for dyeing the color called na-furmance.

(7720) SODA.

Jumd ebence, Arab.
Sujacara, Can.
Hydrate de Soude, Fr.
Astz-natron, Ger.
Sedjee Mittee, Sajeekhar (impurecarbonate) Papudkhar (sub-carbonate) Guz. Hind.
Neter, Heb.
Charum, Mal.
Sajee-khar, Papud-khar Pers.
Sarjica, Sarjikashara, Sans.
Karum, Ponheer karum, Tam.
Savittie-munnoo-ooppoo, Tel.

The substance known in commerce by the name of soda is a carbonate of soda, but mixed with various impurities, according to the source whence it has been obtained; that is either from the Natron lakes, from the soda soils, from the burning of sea-weeds, or from the decomposition of other salts of soda. In commerce, soda generally occurs as a carbonate, as above stated, or in the impure forms of Barilla and Kelp. Barilla is the ash obtained by burning plants on the shores of the Mediterranean, of the Red Sea, and Indian Ocean. Kelp used to be prepared on the coasts of Scotland and its Islands, also on those of Ireland and Wales, and on that of Normandy in France, by burning a great variety of sea-weeds. In its original state, soda is of a gray colour, and fracture vitreous: it is an article of the greatest importance in the soap-glass, and other manufactures

The Arabic name, *sagimen*, seems to be derived from the Hindoo *saji-noon*, that is, sajji, or soda salt. Nitre must have been produced then, as now, in their soil, and borax imported from Tibet, while sal-ammoniac must have been produced ever since they made bricks, as they now do. Alum is in India, obtained by throwing potash on alum slate, which has been sometime exposed to the air.—*Royle, Arts. &c. of India, p.* 463.

Dr. Taylor gave the following as Asiatic Salts of Soda.

Soda, from ashes of species of Salsola and Salicornia, on the Coromandel Coast.
Sujjee or carbonate of Soda, in Tirhoot.
Oosur Salt, Mirzapore, &c.
Lanee Kharee, Scinde.
Natron, from Lonar Lake in Lat. 20° and Long. 76° 30.
Mineral Alkali, Bombay.
Salt, common, (Chloride of Sodium,) Tumlook, Balasore, Tanjore.
,, or Samur, Samur or Samur Lake.
,, Rock Salt, Salt Range of Punjaub,
Borax, Kemaon and Gurhwall, from Tibet.
Khara Noon, (Sulphate of Soda,) Gyah, Tirhoot, &c.

(7721) SODA BIBORAS, SODÆ BORAS, BORAX, Biborate of Soda. Borate of Soda.

Borax Borate de Soude, FR.
Sohaga, HIND.
Boraxsaures Natron, G.
Tincana, SANS.

Borax or ($Na\ O, 2\ B\ O_3 + 10\ Aq = 192$) Biborate of Soda, is supposed to have been known to the ancients, and to have been the *Chrysocolla* of Pliny. The Hindoos have long been acquainted with it; it is their *Sohaga*, Sanscrit *Tincana*, and one of the kinds of *Boorak* of the Arabs. Its nature was first ascertained by Geoffroy in 1732. It is produced by spontaneous evaporation on the shores of some lakes in Tibet, that is, in the same country, with Musk and Rhubarb; brought across the Himalayan Passes into India, and imported into other countries by the names of *Tincal* and *Crude Borax*. It is also obtained by saturating the Boracic Acid of Tuscany (p. 37) with Carb. Soda. Crude Borax is in pale greenish pieces, covered with an earthy coating, and feels greasy to the touch. The natives of Tibet are said to cover it with some fatty matter,to prevent its destruction by efflorescence. It is purified by calcining, which destroys the fatty matter, or by washing with an alkaline ley,which converts it into a kind of soap,then dissolving and re-crystallizing. It crystallizes in irregular hexahedral prisms often terminated by 2—4 converging planes. Sp. Gr. 1·35. It is colourless, transparent, somewhat shining; taste sweetish, a little styptic, and subalkaline. It has an alkaline reaction on Turmeric. The crystals effloresce slightly in the air, are soluble in 12 parts of cold and 2 of boiling water. When heated, they lose water, swell up into a porous substance called *Borax usta v. calcinata*, and at a red heat run into a transparent glass called *Glass of Borax*, much used as a flux. Another variety, more useful in the arts, contains only 5 Eqs. Aq., and crystallizes in octohedra, which are permanent in the air. Borax increases the solubility of Cream of Tartar, p. 86, and converts mucilage of Lichen and of Salep into a thick jelly. Comp. Na O 16·0 Bor' 35·79 Aq. 47 37=100.—*Royle.*

(7722) SODÆ CARBONAS, L E. D. Carbonate of Soda. (Sodæ Subcarbonas. Aerated Mineral Alkali. Fossil Alkali. One of the kinds of *Nitrum* of the ancients, is the *neter* of the Hebrews. It was known to the early Hindoos, and is by them called *Sajji noon* (i. e. *Sajji* or Soda Salt); it is the *Sagimen vitri* of Geber. The Natron lakes of Egypt were known to the ancients, and it was early employed in glass-making, &c. Carbonate of Soda is a very valuable article of commerce being largely used not only in medicine but in arts and manufactures; but it is made from common Salt on a large scale in England, and so cheap that, it is a question if our Indian article, though a natural product, could compete with it in the market.—*Royle.*

(7723) SODA, IMPURE CARBONATE OF. CARBONAS SODÆ IMPURUS.

Karum also Poonheer Karum, Ovar Munnoo Karum, and Poong Karum (TAM-)
Kohlensaures Natron, GREEK.
Saviti Munnoocoppoo, TEL.
Khar, HIND.
Sargica, SANS.
Soudes de Commerce.
Soudes brute, FR.

Barilla is the Ash obtained by burning plants, on the shores of the Mediterranean, of the Red Sea, and Indian Ocean. These plants belong mostly to the natural family of Chenopodeæ, q. v.; and chiefly to the genera Salsola, Salicornia, Suaeda, and Chenopodium. The quantity of Carbonate of Soda in the ash varies from 25 to 40 per cent, and is produced from the combustion of the Oxalate and other Salts of the Vegetable Acids. The soda is no doubt obtained from the soil, for Du Hamel planted Soda-plants inland, and they yielded only Potash. Infusion of a Salsola in cold water afforded by evaporation two Salts, Carbonate of Soda and Chloride of Sodium. *Murr. Chem.* ii. p. 612. A portion of the Chloride is no doubt converted into the Carbonate during the incineration.

Kelp used to be prepared on the coasts of Scotland and its islands, also on those of Ireland and Wales, and on that of Normandy in France, by burning a great variety of Algæ or Sea-weeds. The ashes when cold form *Kelp*, which is in hard cellular masses, of a bluish grey colour, and of a disagreeable alkaline taste, containing from 3 to 8 5 per cent. of Carbonate of Soda, and other salts, as in the case of Barilla, but also some Potash and Iodine (v. p. 4.). Carbonate of Soda is, however, now obtained very cheaply from Chloride of Sodium or Sea-salt. This is first converted into Sulphate of Soda by the action of Sulphuric Acid then mixed with pounded small Coal and Chalk, and heated in a reverberatory furnace and stirred. The Carbonaceous matter abstracts Oxygen both from the Sul. Ac. and the Soda; Sulphuret of Sodium is formed, and decomposed by the Lime; Carbonate of soda, insoluble Oxi-

Sulphuret of Calcium, caustic Soda, and Carbonaceous matter being the result. The insoluble parts are separated by lixiviation, and the Sulphur subsequently burnt away; during which the Soda is completely Carbonated. The mass now contains about 50 per cent. of Soda. Being lixiviated and evaporated, the Carbonate is obtained in large crystals. As Barilla is not sufficiently pure for medicinal purposes, the L. and D. Colleges give directions for its purification. The E.C. justly consider the Carbonate of Soda produced as above pure enough.—*Royle.* Ainslie tells us that some of the more enlightened vyteans knew how to prepare Carbonate of soda from saline earths which contain it, such as Ovar Munnoo, and Poonheer. The soda prepared from the first, the Hakeems of lower Hindoostan called "*Chour ke muttie ka nemuck*," that from the second they call "Chowr ke pool ka nemuck."—*Ains. Mat. Med. p.* 43.

(7724) SODA, MURIATE OF. This mineral salt of very fair quality was exhibited from Bangalore, Bellary and Hyderabad, and is known to occur also in the Guntoor and Nellore Districts, and to be almost invariably accompanied with some interesting minerals, viz. Gypsum, magnesian limestone, sandstone, sulphur, red and brown iron ores, and Alum slate; as most of these minerals have come in from the districts that produce the mineral salt, it would be worth while to direct further search to be made in the vicinity for the sulphur and Alum slate, both of which are valuable products. Sulphur was exhibited from several Districts associated with the above and other combinations. Alum slate is also exhibited from the Cuddapah District, Vellore and the Neilgherries, but the accompanying minerals had not been forwarded. It is of great importance that the minerals associated with Rock Salt and Gypsum should always be recorded or collected, as Fossils of some kind or other almost invariably occur in the vicinity, and these are the best and safest guides for determining the relative ages of the accompanying strata. The following interesting description of the Salt Range in the Punjaub, by Dr. Jameson, will show the importance of this class of formations. The Salt Range, extends from the Eastern base of the Suliman Mountains to the River Jhelum in the Punjaub. Lat 32° 30'—33° 20'

The rocks in this part of the range are, first (1) Magnesian Limestone, (2) New Red Clay and sandstone, (3) Fossiliferous sandstone, (4) Red Clay and sandstone containing Coal and Mineral Sulphur, Rock Salt, Gypsum, brown and red Iron ore and Alum slate. The lower beds contain no organic remains but the upper abound in them. The Iron ore is a red or brown Haematite, so rich that in many places the needle of the compass becomes quite useless even at a considerable distance from the Rocks owing to their being highly Magnetic, from the quantity

of Iron which they contain. The sandston abounds with the Exuviae of enormous anima either Saurians or Sauroid fishes.

The Hills at Kala Bagh contain great quantitie of Aluminous slate from which Alum is obtaine at various manufactories in that Town. The slat well sprinkled with water is laid in alternate strat with wood, until the pile reaches a height of 2 to 30 feet; it is then lighted and the combus tion continued for about twelve hours, in whic time the color of the slate is converted fro greyish black to dark red. This change of colo indicating that the process has been carried t a sufficient extent, the mass is thrown into tank holding as much water as it is compute the Alum is competent to saturate. After thre days the water, which becomes of a dark re color, is drawn off, mixed with a due proportio of potash and boiled down. The residuum o cooling becoming a solid mass of Alum.

A very interesting series of salts consistin chiefly of the Muriate and carbonate of sod from the Loonar Lake in the Hyderabad terri tories was exhibited by Dr. George Smith, Re sidency Surgeon Hyderabad. These have alread been carefully examined by Professor Mayer an reported upon at some length in Vol. 1, Ne series of the Madras Journal of Literature an science. The following is a condensed epitome c the Report, and of the chemical composition c the salts:—

No. 1. Dulla.

This is a Carbonate of Soda with a faint trac of Muriate of Soda and about 2 per cent of im purities.

No. 2. Nimmuck Dulla.

Is nearly pure Muriate of Soda.

No. 3. Khuppul.

Is carbonate of Soda, with water and about per cent of impurities.

No. 4. Puppree.

Is nearly pure Carbonate of Soda.

No. 5. Madkhar.—This is an impure salt con taining Carbonate of Soda, 27 }
Clay and sand,. 30 } water about 17
Common Salt,. 25 }

No. 6. Bhooskee.

This is also a crude impure substance containing Neutral Carb of Soda.	26
Insoluble matter chiefly sand and Clay,	58
Water, ...	15
Common Salt, ...	2

No. 7. Travertin.

This contains Carb of Lime, ...	78
Carbonate of Magnesia, ...	4
Insoluble matter with Oxide of Iron &c.	9
Chloride of Sodium, ...	2
Water, ...	3

The Natron lake of Loonar occurs in the Circar of Meinker Soubah of Berar about 45 miles N. W. of Hingolie in Lat. 20 N. it is about 51 feet below the level of the surrounding ground in a kind of Crater of 5 miles in circumference, the lake being about 3 miles in circumference and surrounded by luxuriant vegetation; springs of clear soft water occur close to the lake, which has evidently been extending its bounds lately, as numerous dead trees are standing within its margin, and a bowrie of sweet water protected by a wall is now completely surrounded by the water of the lake. An intolerable stench of sulphuretted hydrogen is emitted by the lake during the heat of the day and its waters prove destructive to animal and vegetable life, though flocks of Duck and Teal lot the surface of its waters. There are two saline springs near the Centre of the Lake and about ½ a mile apart. These never become dry. It is supposed that the muriate of Soda from this source coming in contact with the carbonate of Lime which abounds in the vicinity causes the deposition of the carbonate of Soda or Natron Salt in a greater or less state of purity. The depth of the lake near the salt springs varies from 6 feet during the hot months to 12 or 14 feet during the rains. The Salt is raised by divers who bring it up in their hands, it is much prized and finds a ready sale in Berar, Nagpore, Candeish, and Poonah, to which places it is carried in Bamboo baskets and retailed by dealers. The lake has not been regularly worked since 1836 in which year 2,136 candies of the different Salts were raised, valued at Rs. 60,081. In 1853 Major Johnston raised 35 candies valued at Rs. 1,461-4-0.

Some suggestions have been proposed for increasing the productiveness and revenue of the lake. These are contrivances for preventing the flushing of the Lake with water, supplied by the main feeder, and by several streams from the surrounding water shed, such as bunds and channels.—*M. E. J. R.*

(7725) SODA, NITRATE OF, CUBIC NITRE.

Nitrate de Soude, FR. | Wurfelsalpetre GER.

Consists of nitric acid and soda. It is similar in its properties to saltpetre, differing chiefly in being more pungent in taste, more soluble in cold water, more inclined to attract moisture from the atmosphere, and in crystallizing in a rhomboid form. It is highly esteemed as a manure for pastures, and for all other sorts of agricultural produce, except that grown in heavy wet soils. It is also applied to many of the purposes for which saltpetre is used, though being more deliquescent than that salt, it is not adapted for the manufacture of gunpowder. This salt is found in immense quantities in deposits in South America, particularly in the districts of Atacama and Tarapaca in Peru.—*Waterston. Faulkner.* Samples of this Salt were exhibited at the Madras Exhibition of 1857, from Bellary and Hyderabad, where it seems to form a natural efflorescence. Its chief use is as a substitute for saltpetre for the manufacture of Nitric and other acids and chemical substances. It is too deliquescent for making gunpowder, though it answers well for some descriptions of fireworks. The samples exhibited were indifferent.—*M. E. J. R.*

(7726) SODÆ SESQUICARBONAS. Sesqui-Carbonate of Soda. Natron.

Anderthalb Kohlensaures Natron, GER. | Natron, FR.

A Sesqui-carbonate of Soda ($NaO\ 1\frac{1}{2}\ CO_2 + 2\ HO = 83$) exists in nature; for the Trona found near Tripoli in Africa, the Natron of the country to the west of the Delta of the Nile, and of the Lonar Lake described by the late Dr. Malcolmson, have all been proved to consist of 1½ Eq. of Carbonic Acid to 1 of Soda; or Na O 38·55 + C 39·76 + Aq. 21·69=100. The analyses were made in the Laboratory, and the specimens are deposited in the Museum, of King's College. A solution of it may be obtained by heating Bicarbonate of Soda in solution to a temperature of 212°.—*Royle.*

(7727) SODÆ (SESQUICARBONAS, L.) BICARBONAS, E. D. *Sodæ Carbonas.* Bicarbonate, and Carbonate of Soda of the shops.

Zweifach Kohlensaures Natron, GR. | Bicarbonate de Soude, FR.

The Bicarbonate of Soda ($NaO\ 2CO_2 + 2HO = 94$) of the E. and D. P's is the same salt as the Sesqui-carbonate of the L. P. That which is met with in commerce is usually a pure salt, but occasionally mixed with a small portion of the Carbonate. It exists in some mineral springs highly acidulated with Carb. Ac., as in those of Vichy.

Prop. As usually sold, it is colourless, in powder, or in minute scale-like crystals, having a saline, slightly alkaline taste and reaction.—*Royle.*

(7728) SODA, SULPHATE OF. L. E. D. Sulphate of Soda. *Natrum Vitriolatum. Sal Catharticus. Sal mirabile Glauberi.*

Sulphate de Soude, FR. | Nemuck, PER. & HIND.
Schwefelsaures Natron, GER. | Malh. ARAB.
Oopoo, TAM. & TEL. | Noona, HINDEE.

Sulphate of Soda ($NaO;\ SO_3 + 10\ Aq. = 162$), or Glauber's Salt, is found effloresced on the soil in some countries, as in India, where it is called *kharee nimuk* or *kharee noon.* It exists in sea-water; in that of some lakes and mineral springs, also in Glauberite. It is found in the ashes of many plants, and in some animal secretions.—*Royle.* In Bengal, *Sulphate of Soda,* or Khari Noon, is an impure sulphate of soda extracted from an earth in which the salt exists, in the proportion of from ten to fifty per 100. It is prepared in large quantities by simply washing the earth. It is usually sold in crystalline dirty brown masses. These are purified by a simple process often described.—*Beng. Phar. p.* 362.

(7729). SODII CHLORIDUM, L. SODÆ MURIAS (PURUM, E.) E. D. Chloride of Sodium. *Muriate of soda* Sodæ Murias purum, E. *Sal Fossile. Sal Marinum. Sal Gemmæ.*

Chlorure de Sodium, FR. | Chlor Natrium, GR.

Chloride of Sodium ($\mathrm{Na\,Cl}=60$), or Common Salt, is abundantly diffused in nature, and, being an essential article of diet, must have been known from the earliest ages. It is found in many animal solids and fluids, and in the juices of some vegetables. It exists in large quantities in the solid form as Rock Salt, or in solution in some springs, and everywhere in sea-water. From these it is obtained by evaporation, when it crystallizes with slight variations of appearance according to differences in the process. These varieties are known by different names in commerce, as Butter, Stone, and Basket Salt, also Sea Salt, and, in large crystals, as Malden, Fishery, and Bay Salt. Most of the kinds of Salt require purification, by being again dissolved and re-crystallized (Sodæ Murias purum, E.) as they are apt to contain other salts, as alkaline and earthy Sulphates and Chlorides, especially of Magnesium and of Calcium.—*Royle.*

(7730) SO-E. A garment of leaves, which, as well as hats, is fabricated by the agricultural laborers of Northern China, from the leaves of *Chamærops excelsa*, a palm indigenous in the Northern and Central parts of that country: but in the Southern districts of China, the *So-e*, is made from the leaves of the Bamboo and of other broad leaved grasses.

(7731) SOI KEERY, *Tam.* This green, says Ainslie, I have never seen, nor do I believe that the Botanical name of the plant has been ascertained. It grows in the Southern parts of the Peninsula and is eaten by the poor.—*Ains. Mat. Med. p.* 257.

(7732) SOJA, a genus of Plants belonging to the natural order *Leguminosæ*. *Soja hispida* (Mœnch), *S. Japonica* (Savi), the *Dolichos Soja* (Linn.), is a native of Japan and the Moluccas, and abundant in the peninsula of India, though probably introduced there. The seeds resemble those of the haricot, French or kidney bean, and are used by the Chinese to "form a favourite dish called 'teu-hu,' or 'tau-hu,' which looks like curd, and which, though insipid in itself, yet with proper seasoning is agreeable and wholesome." The Japanese call the seeds 'Miso,' and put them into soup, of which they sometimes partake three times a day. They likewise prepare with them the sauce termed 'Sooja,' which has been corrupted into 'Soy.' Soy is only sparingly used as a sauce in this country. It has the character of being a useful stomachic, but not more so than any of the other condiments when used with moderation.—*Eng. Cyc.*

(7733) SOLA, frequently *Shola*, is the name of a Plant common in moist places, and in the rainy season in many parts of the plains of India It belongs to the genus *Æschynomene*, and has been called *Æ. aspera* by Linnæus, from the lower part of the stem being rough and scabrous, as well as the legumes. It has been called *Æ. lagenaria*, both by Loureiro and Roxburgh. The plants are remarkable for their light and spongy texture, and seem indeed to be composed almos entirely of pith. On this account the thicke stemmed plants are collected in the dry month and the light substance applied to a variety o uses, as for making some kinds of toys, and th floats of fishermen's nets; cut into thin slices and pasted together, they are much employe for making hats, which, being light and having broad brims, are well suited for protecting th head from the influence of the powerful Indian sun, especially if a handkerchief be put loosely into the crown of the hat. This substance ha also been employed for lining drawers of natural history, and in its texture very much resembles the substance called rice-paper, which is th pith or stem of a Malvaceous plant cut into thin slices.—*Eng. Cyc.*

(7734) SOLANACEÆ, a natural order o Plants belonging to the dicarpous group of Monopetalous Exogens. This order is composed o herbs or shrubs, rarely of arborescent plants with colourless juices, round or irregularly angle stems or branches, sometimes armed with thorn or prickles; their leaves alternate, simple, entire or lobed. The inflorescence is variable, mostly axillary, sometimes terminal; pedicles withou bracts, and the flowers regular and united. Th plants of this order are natives of mos parts of the world, without the arctic and the antarctic circles, and especially within the tropics The order is one of the most important an interesting in its class, from its bringing togethe plants of the greatest utility, yet possessing apparently opposite properties. It is a great advantage of a natural system that it brings together not only plants that are allied in structure, but in properties also; but this order seem to form an exception. The Deadly Night-shade the esculent Potato, the pungent Capsicum the mild Tomato, the wholesome Egg-plant, an the poisonous Tobacco, are all found here. The will all however, on close examination, b found to possess the same properties in greater or less degree. The potato, the tomato and egg-plants possess, when uncooked, in a mil degree, the properties of the Nightshade, th Stramonium, and the Henbane, confirming th remark of De Candolle, "that all our aliment contain a small proportion of an exciting principle, which, should it occur in a much greate quantity, might become injurious, but which i necessary as a natural condiment." In fact when food does not contain some stimulatin principle, we add it in the form of spices Many of the plants of this order are used in nedicine, amongst the most valuable of which re Henbane [HYOSCYAMUS], Deadly Night- hade [ATROPA], Bitter-Sweet [SOLANUM], Stra- nonium [DATURA], and Tobacco [NICOTIANA]. The species of *Physalis* were formerly used in nedicine, but are not now in repute in England. *P. Alkekengi*, the Common Winter Cherry, s grown as an ornamental plant ; and in Arabia, nd even Germany and Spain, the berries are aten as a dessert. *Lycium barbarum* is known n England as Tea-Plant, and has been re- ommended as a substitute for the Chinese plant. The Calabash-Trees of the West Indies and the American continent are different species of *Crescentia*, which is often referred to this order. The fleshy pulp of the fruit of some is eaten, ut in most species is deleterious. The most aluable part of the calabashes is their rind, hich is tough, and is applied by the negroes o a variety of purposes. Cups, mugs, bowls, asins, and saucepans, are made from them, and nany other articles of household use. Cayenne- epper [CAPSICUM] is the produce of the order, s well as the potato, tomato, and egg-plant SOLANUM], which are used extensively as arti- les of diet.—*Eng. Cyc.*

(7735) SOLANUM, the name of one of the ost extensive genera of Plants, the type of the atural order *Solanaceæ*. This genus is distin- uished by the following characters :—Calyx ermanent, 5-10-parted ; corolla rotate ; anthers blong, connivent, opening by two pores at the xtremity. Fruit a berry, subglobose, 2-celled, ometimes 3-4-celled. The species are herbs or hrubs, unarmed or prickly, rarely spiny. The eaves are entire, sinuated or lobed, mostly al- ernate. Upwards of 400 species of plants be- onging to this genus have been enumerated, in- luding many with apparently very opposite roperties. The esculent Tomato, the Egg-plant nd the invaluable Potato, with the various pecies of poisonous Night-Shades, are found nited so closely by botanical characters that it impossible generically to separate them. The roperties of these plants however do not differ kind but in degree; and the berries and leaves, nd even the tubers when uncooked, of the otato, possess in a mild degree the narcotic roperties of the poisonous Night-shades. Many them have also very handsome flowers, and e much cultivated in English gardens and green- ouses. From the immense list of species be- onging to this genus, we shall select for descrip- on a few of those that are used as medicines, food, or are much cultivated. Several the species of *Solanum* are recorded as having edical properties. *S. Jacquini* is considered y the native practitioners of India as an expec- rant; *S. Bahamense* is used as a gargle for sore roat in the West Indies ; *S. mamosum. S. pani- ulatum* and *S. cernuum*, have the reputation of ing diuretic and astringent.—*Eng. Cyc.*

(7736) SOLANUM. *Species.*

Vatarajakoolo, CAN.

Vatarajakooloo is the Canarese name of a species of wild Brinzal (without thorns) which is eaten by the Natives on the Malabar coast.—*Ainslie, p.* 246.

(7737) SOLANUM ÆTHIOPICUM. ÆTHIOPIAN NIGHTSHADE. Stem herbaceous, leaves ovate-repand, angular; peduncles usually 1-flowered, drooping. Berries torulose. It is a native of Ethiopia, China, and Japan. There are two varieties recorded : one, the *Æ. violaceum* is a native of China, and the fruit is frequently eaten in that country as a dessert. It has a large spheroid oval berry of a red colour. The other variety is the *S. Æsculentum*, having a prickly stem, and small yellow berries of the size of peas.

(7738) SOLANUM DULCAMARA, Woody Nightshade, or Bitter-Sweet. Stem shrubby, thornless, climbing, flexuous ; leaves cordate, upper ones jagged ; corymbs almost opposite the leaves. It is a native of Europe, Asia and North America, in hedges and among bushes. It is plentiful in Great Britain. It has purple flowers and crimson berries, which latter may be mistaken by children for red currants, a mistake that has sometimes been attended with fatal consequences.—*Eng. Cyc.* It is a native of temperate climates, a shrubby twining plant, with scarlet, oval, bitter and juicy berries. These are acrid narcotics, and poisonous in moderately large quantities. The young stalks and tops have been much used in medicine as a diaphoretic and alterative, especially in the treatment of cutaneous diseases, and in asthma; in lepra, psoriasis, and similar affections, it is said to be employed externally with good effect. It is on the whole, however, an unimportant article, and not likely to be much prescribed in Indian practice. The Sol. Dulcamara, or a variety thereof, is found on the Choor mountain. (*Royle.*) —*O'Shaughnessy, p.* 462.

(7739) SOLANUM INCERTUM.

Mannuttha-Kalee, TAM.

The leaves are used as a pot herb. The fruit and leaves in the preparation of chatnies ; cultivated by the natives commonly.—*Jaffrey.*

(7740) SOLANUM JACQUINI. Fruit of Jacquin's Nightshade.

Cundungkatre kai, TAM.	Vaukoodakai, TEL.
Dorle ka pull, DUK.	Kuntakari, SANS.

This is the edible produce of a low growing prickly (medicinal) plant, used only by the common people. See article Cundungkatri vayr in Ainslie's Catalogue 1st, Section 3d.—*Ainslie, page* 239.

(7741) SOLANUM LYCOPERSICUM. Lin. LOVE APPLE or TOMATO.

Scemie Takalie pullum, also Thuckkalee, TAM.	Tamatie, MALAY.

This is chiefly cultivated by the European inhabitants as a valuable ingredient in soups and stews.—*Ainslie, p.* 232. Is used also for sauces, chatnies, garnishing, soups, &c.: produces the best fruit when trained on a trellis; more a luxury than valuable as a vegetable.—*Jaffrey.* The large lobed, red berries, and very succulent, of the Tomata, or love-apple, contains much malic acid, and used in sauces.—*O'Sh. p.* 463. Solanum Lycopersicum of Linnæus, is the Common Love-Apple or Tomato. This, with some other of the older species of *Solanum*, now form the genus *Lycopersicum*, which is distinguished by possessing a calyx 5-6 parted; corolla rotate, 5-6-cleft; stamens 5; anthers conical, connate at their extremities by an elongated membrane, and dehiscing lengthwise inside; berry 2-3-celled; seeds villous. The present species is called *L. esculentum*; it has herbaceous pilose stems; unequally pinnate leaves; leaflets cut, attenuated at the apex, glaucous beneath; flowers many, united; berries torulose. This plant is a native of South America, but it is much cultivated and well known in Southern Asia, United States of North America, and in France, Germany, and Italy. When ripe, the fruit has an acid flavour, and is added to soups, sauces, &c. It is also used in confectionary as a preserve, and sometimes as a pickle. It is not often used in Britain, but in Italy, near Rome and Naples, whole fields are covered with it, and scarcely a dish is served up into which it does not enter as an ingredient. In the cultivation of these plants, in England, the seed should be sown in March in a hot-bed, and when 2 inches high they may be pricked out into another hot-bed. In May they should be transplanted into a warm south border, where they may have the full sun, and the fruit may ripen quickly. The stem runs up 6 or 8 feet high, and should be trained to stakes or nailed up a wall or poles. The fruit begins to ripen in August, and may be gathered in October, and, when kept dry, will keep good till November. There are several varieties cultivated; the best are called the Large and Small Cherry and Pear-Shaped Red, and the Large and Small or Cherry-Shaped Yellow. The size of the fruit is seldom larger than a golden-pippin apple. (Don's Miller, vol. iv., p. 444).

(7742) SOLANUM MELONGENA, Egg-Plant, Mad Apple, or Jew's Apple.

Bengan, Brinjal, HIND. | Kutheereekai, TAM.

This is everywhere cultivated in India and Cashmere. The fruits large, ovoid, firm, and innocent, insipid.—*O'Shaughnessy, page* 463. Several varieties are largely cultivated as a vegetable in Ajmere.—*Gen. Med. Top. page* 183. It is one of the most useful of Indian vegetables: and is used in culinary purposes in various ways. The large Cape varieties are the best; commonly cultivated and used by Europeans and Natives; require good soil and abundance of water.—*Jaffrey.*

Stem herbaceous, woody at the base, clothed with starshaped hairs; ovate serrated leaves flowering peduncles reflexed; fertile peduncle sol tary, sterile one racemose; calyx campanulate corolla angular. It is a native of the East Indies and also said to be of Arabia. This plant has pu ple flowers, and bears large, smooth, shining be ries, which are the shape and size of a small hen' egg. Two varieties of this plant are recorded— the *S. M. oviyerum*, in which the stem, caly and leaves are without thorns; and the *S. M* *esculentum*, in which these parts are more or les covered with thorns. Several sub-varieties both these are recorded, varying in the shap and colour of the fruit. The berries are mostl of a white colour, but in some of the sub varieties they are yellow, red, purple, and black The fruit of this plant is used by the Frenc and Italians in stews and soups. For this pu pose the varieties used are the oval-shaped whit the globular-shaped white, and the purple or vio let-coloured of both forms. In cultivating then in Britain, they may be reared in hot-beds in rich light soil, or in fine summers they will eve produce their fruit in that country against wall, if planted out in June after having bee struck in a hotbed. See BAYNGUM also EGG PLANT.—*Eng. Cyc.*

(7743) SOLANUM NIGRUM.

Arrub ul-salib, ARAB.

Common or Garden Nightshade. Stem her baceous, without thorns; leaves ovate, bluntl toothed, and waved; umbels lateral, droopin Throughout Europe it is a weed in cultivate ground, and is also found in Africa and Asia. I is common in gardens, fields, and waste places i Great Britain. It has white flowers, producin small berries of a black colour.—*Eng. Cy* *Solanum Nigrum* grows in waste places in mo countries, and is employed as a narcotic by th Hakeems. The fruits are very dangerous, an act in the same manner as those of the belladon na mandrake. The extract of the whole plan according to Orfila, acts like *lactucarium.*— *O'Shaughnessy, page* 462.

(7744) SOLANUM NIGRUM, Fox GRAP Var.

Munna Takalie pullum, TAM.
Communie, DUK.
Mackoe, HIND.
Ruba Tarbue, PERS.
Canchie pundoo, TEL.
Annbussaleb, ARAB.
Kaka Machie, SANS.

This is the small black berry of a low growin species of Nightshade: which, although it h been reckoned poisonous in Europe, is eaten b the Natives of India, and as far as Ainslie lear ed, with impunity. It is sweetish, but not ver palatable.—*Ainslie, page* 228.

(7745) SOLANUM OVIGENUM, or Eg plant, is distinguished from *melongena* by it pulpy fruits, which are stated to be narcotic.— *O'Shaughnessy, page* 463.

(7746) SOLANUM PSEUDOQUINA, Fals Quina Nightshade. Stem shrubby, unarme

Leaves oblongo-lanceolate, narrow, acute-entire, glabrous above, but with fascicles of villi in the axils of the nerves beneath. Racemes extra-axillary, short; calyx glabrous. This plant is a native of Brazil in the district of Curitiba, in St. Paul without the tropics. The Brazilians use this for the same purposes as the Quina or Jesuit's Bark. It is intensely bitter, and may with advantage be used as a substitute for that bark.

(7747) SOLANUM PUBESCENS, Lin.

Choondaykia or soondaykia Tam.
Shondek pulla Duk.
Woostaykia, Tel.
Katoobie, Sans.

This is about the size of a small marble and grows wild in the woods. It is somewhat bitter and like the Toodoovullay (its congener) is commonly eaten fried, having been previously sprinkled with a little salt and water.—*Ainslie, p.* 238.

(7748) SOLANUM SANCTUM, Palestine Egg-Plant. Stem shrubby, tomentose; leaves ovate-repand, oblique at the base, clothed with hoary tomentum on both surfaces. Berries nearly globose. This plant is a native of Palestine; it is often found in collections of plants. There are several other species of *Solanum*, which, on account of the size, form, and colour of their fruits, are called Egg-Plants as *S. Indicum*, the Indian Egg-Plant, &c.

(7749) SOLANUM SODOMEUM, Sodom Egg-Plant, or Apple of Sodom. Stem shrubby, diffuse; prickles straight, dilated at the base; leaves oblong-sinuate, shining above, and rather scabrous and prickly on both surfaces; lobes obtuse-angular; peduncles bifid. It is a native of the North of Africa and the south of Europe. The Fruit of this plant is white, and about the size of a walnut. It is very subject to the attacks of an insect which deposits its eggs within the germen, and as the fruit enlarges, the larvæ of the insect, as in the case of many other fruits, destroy and pulverise the whole of the interior whilst the rind is left unchanged and entire. When the fruit is gathered under these circumstances, it is crushed to pieces by the hand; or if conveyed to the lips, the mouth becomes filled with an ash-like powder, exceedingly bitter to the taste. To these berries remarkable properties have been assigned by Josephus, Tacitus, and others. Mandeville, an old English writer, says, speaking of the Dead Sea, "And there besyden grown trees that baren fulle faire apples and faire of colour to beholden, butte whosoe breaketh them or cuttethe them in two, he shall find within them coles and cyndres." Milton finely alludes to this fruit in the lines:—

> "Greedily they pluck'd
> The fruitage fair to sight, like that which grew
> Near that bituminous lake where Sodom flamed.
> This more delusive, not to touch but taste
> Deceived; they fondly thinking to allay
> Their appetite with gust, instead of fruit
> Chewed bitter ashes."

(7750) SOLANUM TORVUM.

Sooonday-kai, Tam.

Used as a vegetable by the natives: a weed.

(7751) SOLANUM TRILOBATUM, Lin.

Moondla moosteh-koora, Tel.
Achooda, Sans.
Toodoovullay Keeray, Tam.

(7752) SOLANUM TRILOBATUM. I.

Fruit of the Three lobed Nightshade.

Moondlamoostek kai, Tel.
Toovullay kai, Tam.
Achooda, Sans.

This is round and small being not much larger than a marrow fat pea. It has a somewhat bitter taste not unlike that of its congener the choondaykai, and is commonly eaten fried having been previously sprinkled with a little salt and water.—*Ainslie, p.* 245 *and* 357.

(7753) SOLANUM TUBEROSUM. Common Potato, is known in the genus by its tuberous subterranean stem, herbaceous stems without thorns, unequally pinnate leaves with entire leaflets, and articulated pedicles. It is one of the plants for which we are entirely indebted to America. It is found native in the greatest abundance on the western coast of South America. Like most plants which are much cultivated, an abundance of varieties have been produced from the original plant, and in the leaves, colour of the flowers, shape, size, and colour of the tubers, it has a great tendency to depart from its normal character. Two other species of *Solanum*, namely, *S. Valenzuela* and *S. montanum*, produce edible tubers, but they are little used.—*Eng. Cyc.* In Tenasserim the potatoe is of easy culture, but the tubers are very small, and it is not an object of cultivation, though with a little attention, it might possibly be made one.—*Mason.*

(7754) SOLANUM VERBASCIFOLIUM, Mullein-Leaved Nightshade. Stem shrubby; leaves ovato-oblong, acuminated, entire, tomentose, white beneath, without any leaves in the axils; corymbs nearly terminal, dichotomous; calyx semi-quinquefid. It is a native of Asia, America, and the tropical parts of Australia. This plant is frequently cultivated. Every part is covered with a powdery white tomentum. The flowers are white, and the berries are of the size of small cherries.

(7755) SOLE. PLAGUSIA. TENASSERIM SOLE. A small fish of the sole family that grows to nine inches or a foot long, is sometimes seen in the bazar. It has no pectoral fins, and the dorsal, caudal and ventral fins are united, so it is a species of plagusia. The natives think that two of them always swim together, with their flat, uncoloured sides united.—*Mason.*

(7756) SOLLYA HETEROPHYLLA. PITTOSPORACEÆ. These are ornamental little shrubs with bright blue bell flowers, should be grown in a loamy soil, and are propagated by seed or cuttings.—*Riddell.*

(7757) SOMRAJ.—Seeds of Conyza (or Serratula) anthelmintica—a worm medicine often sold in the bazar instead of Zeera seeah, or black carraway.—*Ben. Phar.*

(7758) SONCHUS OLERACEUS.

Kaat-moolingee-keeray, Tam.

The Sow Thistle; used in the Neilgherries as a pot herb by the natives.—*Jaffrey.*

(7759) SONERILA. Perhaps the prettiest little annual in the neighbourhood of Tavoy is a species of Sonerila. Its bright purple blossoms peeping up in the grass attract the attention of the most casual observer.—*Mason.*

(7760) SONF. Indian Fennel. Fœniculum Panmorium.—*Ben. Ph. page* 226.

(7761) SONNERATIA, a genus of Plants belonging to the natural order *Myrtaceæ*, so named by the younger Linnæus in compliment to M. Sonnerat, well known by his 'Voyage à la Nouvelle Guinée,' and his 'Voyages aux Indes Orientales et à la Chine,' and who made known many new plants. The genus is characterised by having a 4-6-cleft campanulate calyx, adhering to the ovary at the very base; petals 4 to 6, alternating with the valvate lobes of the calyx; stamens numerous; styles filiform, with a peltate stigma; fruit baccate, appearing half-superior, many-celled; seeds numerous, nestling in a fleshy pulp, curved: the species form moderate-sized trees, with opposite leaves, which are entire, thick, and almost veinless; flowers usually solitary, large.—*Eng. Cyc.* Dr. Hooker found *Sonneratia*, *Heritiera littoralis*, and *Careya*, forming small gnarled trees on the banks, in the Sunderbuns, with deep shining green-leaved species of *Carallia*, *Rhizophora*, and other Mangroves. Occasionally the gigantic reed-mace (*Typha elephantina*) is seen, and tufts of tall reeds (*Arundo*).—*Hooker, Him. Jour. Vol.* II. *page* 355.

(7762) SONNERATIA ACIDA, is the best known species, being the Pagapate of Sonnerat, and the Blatti of Rheede, which has an acid eatable fruit. The branchlets tetragonal; leaves oval, oblong; calyx 6-cleft; petals 6; berry globose. The tree is forty feet high, and is a native of New Guinea and the Moluccas, as well as of the Malabar coast and of the delta of the Ganges.—*Eng. Cyc.* This abounds in the Tenasserim mangrove swamps, and on the banks of almost every stream on that coast as far as tide-waters reach: the natives use it for various economical purposes, and it is said to be "a better substitute for coal in steamers than any other kind of wood."—*Mason.*

(7763) SONNERATIA ALBA, is a species of the Moluccas, and *S. apetala*, a native of Ava, near Rangoon, as well as in moist situaons along the Burmese coast.—*Eng. Cyc.*

(7764) SONNERATIA APETALA. Weeping Sonneratia.

Kambala. Burm.

There is a species of sonneratia in the low wet lands near the mouths of some of the Tenasserim rivers, well deserving of a place in our cities. It bears a strong resemblance to the weeping willow and is one of the most graceful trees in the country. The casuarina has been removed from the coast to our compounds, and the sonneratia is quite as deserving.—*Mason. Sonneratia apetala*, furnishes a strong hard wood of coarse grain, found throughout the Sunderbunds, under the parallel of Rangoon. It is the timber of which boxes for packing beer and wine are made of in Calcutta; gives a red-colored wood, strong and adapted for house-building.—*McClelland.*

(7765) SOOJA. A pickle prepared in Japan from the Dolichos bean.—*Simmonds.*

(7766) SOONDREE. Heritiera Minor. *Syn.* Heritiera fomes. The soondree is a gloomy looking tree that may be distinguished from all others for many miles distant. It is remarkably characteristic of a peculiar soil. Wherever the tides occasionally rise and inundate the land, this tree is sure to be found throughout the whole Tenasserim Coast, but it is never found either on the high dry lands on the one hand, nor in the wet mangrove swamps on the other. It is the tree which was described by Dr. Buchanan Hamilton, who accompanied Symes' embassy, as *Heritiera Fomes.* It is the toughest wood that has been tested in India. When Rangoon teak broke with a weight of 870 pounds, soondree sustained 1312 pounds. It is not a very durable wood, but stands without a rival in strength, although so common on the other Coast, as to give name, as Captain Munro thinks, to the Soonderbunds, yet the tree grows much larger in the Tenasserim Provinces, and affords finer timber.—*Mason.*

(7767) SOONKASOOLA WOOD.

Soonkesooloo, Tel.
Sunkesur ke lakree, Hin.
Vadee naroinin, Tam.

(7768) SOORINJAN, Hermodactylus. A root in appearance like the pignut, imported via Pali, is bitter and sweet in taste, used as an aphrodisiac.—*Gen. Med. Top. p.* 150.

(7769) SOORIYE. A hard, though somewhat coarse and open grained, heavy Ceylon wood, of a deep chesnut colour.

(7770) SOOT'HNEE. *Duk.* Dioscorea Fasciculata. Yam. Consists of many tubers, about the size and shape of an egg. They are covered with a light coloured thin skin; internally they are white. They are not only eaten, but starch is made from the roots.—*Riddell.*

(7771) SOPHORA, a genus of Plants belonging to the natural order *Leguminosæ*, said to be so named from an Arabic name (Sophera) of one of the species. These are ornamental shrubs and trees, found in central and tropical Asia, also in the warm parts of North America and the equinoctial and sub-tropical parts of South America. The genus is characterised by having a 5-toothed campanulate calyx; corolla papilionaceous; petals of the keel usually united together at their apex; stamens 10, distinct; legumes moniliform, without joints or wings, and containing several seeds, the leaves are impari-pinnate, usually exstipulate and terminal; the inflorescence is in racemes or panicles of yellow, white, or blue flowers. The species best known in England are *S. Japonica* and *S. Chinensis*, which, being from the northern latitudes of the countries from which they are named, are hardy enough to withstand the climate of England; and it has been proposed to engraft the Nepaul *S. velutina* on the *Japonica*. Being handsome trees, with both leaves and trees differing much from European trees, they are well adapted for standing singly in lawns. They are raised from layers, but also from seeds and require a little protection when young.—*Eng. Cyc.* Wight gives Sophora glauca, 979; heptaphylla, 1155; robusta, 245 and *page* 16 *Vol.* III.

(7772) SORECIDÆ, the family of Shrews, or Shrew-Mice, comprising the genus *Sorex* of Linnæus. This family, according to Mr. Swainson, embraces the Shrews, Moles, and Hedgehogs, with the following characters:—Muzzle lengthened, pointed. Legs short, feeble; feet pentadactylous. Lower incisors generally very long, pointing forwards. No lateral membranes, Mammæ ventral. The family thus characterised includes the genera *Erinaceus*, Linnæus; *Sorex* Linnæus; *Mygale*, Geoff.; *Scalops*, Cuv.; *Chrysochloris*, Cuv.; *Talpa*, Linnæus; *Centenes* Cuv.; and *Condylura*, Desm.—*Eng. Cyc.*

(7773) *Sorex Indicus*, S. MYOSURUS, Pallas, the Musk-Rat of India, has much the same appearance in point of colour and the size of its naked ears as our Common Shrew, but is nearly as large as England's common Brown Rat, and the tail is round and thinly furnished with hairs. This species diffuses a most powerful odour of musk, which impregnates everything that is touched by it. Even the wine in a well-corked bottle, over which the animal has run, is rendered unfit for use in consequence of the flavour imparted to it. Cuvier states that this species is found throughout the East Indies and in a part of Africa, and that it is among the animals embalmed by the ancient Egyptians; but, according to others, it is *S. Olivieri*, Desm, which Olivier found in a mummy state in the catacombs of Sakkara.—*Eng. Cyc.*

(7774) *Mygale moschata*, *Castor moschatus*. Linn., appears to be the Dæsman of the Fauna Suecica; Le Desman of the French; the Biesamratze of the Germans; the Wychozhol of the Russians; and the Muscovy or Musk-Rat of the English. The tail is shorter than the body, scaly, nearly naked, contracted at its base, cylindrical, and convex in its middle, very much compressed vertically at its extremity; fur brown or dusky above, whitish-ash below. Total length, including the tail, about 15 inches, of which the tail measures 8 inches. It is found in the river Volga, and the adjacent lakes from Novgorod to Saratov. This species does not appear to have been seen on dry land; and indeed it is broadly asserted that it never goes there, but wanders from lake to lake in fortuitous floods only. It is often seen swimming or walking under the water, and coming for air to the surface, where, in clear weather, it is apt to sport.—*Eng. Cyc.*

(7775) SORGHUM, a genus of Grasses, said to be named from the Oriental name of one of the species, of which 'sorgo' is the Italian name. The species have sometimes been referred to *Holcus*, sometimes to *Andropogon*, but from their habit and uses they seem well entitled to be considered as a distinct genus, which may be characterised as having the flowers monœcious, panicled; glume coriaceous, cartilaginous, 2-flowered; the upper flower hermaphrodite, the lower palea more or less deeply bifid and awned between the lobes, the upper often wanting. The species form tall grasses with succulent stems, and are found in the tropical parts of Asia, whence they have spread to the warm parts of Europe.—The species commonly sown in India are *S. vulgare* and *S. bicolor* (Kala-Joar). *S. cernuum* is a distinct species, which forms the principal food of the mountaineers of the Munipoor district. *S. saccharatum* is also cultivated in many parts during the rainy and cold seasons, on land which is too high for rice. The stalks and straw of all are much valued as fodder for cattle, being cut into small pieces, commonly called Kurbee, *Hind.*—*Eng. Cyc.*

(7776) SORGHUM SACCHARATUM. SORGHUM MILLET. A millet plant is occasionally seen, which in the United States is called "broom-corn," it being there manufactured into brooms.—*Mason.*

(7777) SORGHUM VULGARE. HOLCUS SORGHUM. Great Millet. Holcus Saccharatus. Linn. Joar. Guinea Corn.

Cholum, TAM.
Juvar, GUZ.
Joarie, DUK.
Jooar, HIND.
Chavela, MAL.
Jolah, CAN.
Zonaloo, TEL.
Durra, also Zurrut, ARAB.

Red.

Red Jawaree, ENG.
Yerra jonnaloo, TEL.
Lall Jooaree, HIND.
Sagappoo soalum, TAM.

Brown.

Brown Jawaree, ENG.
Jonnaloo, TEL.
Jooaree, HIND.
Soalum, TAM.

White.

White Jawaree, ENG.
Tella jonnaloo, TEL.
Safaid jooaree, HIND.
Vellai soalum, TAM.

Sorghum Vulgare is the largest of the small cereal grains, and may be considered the representative of the Indian Corn (*Zea Mays*) in America, where it is usually called Guinea Corn, and in some works the Great or Indian Millet. The different kinds are usually called Joar in India, where they form a principal object of culture, and one of much more importance than would appear in Europe, as many of the inhabitants live as much upon these small or dry grains as upon rice. The Joar is the Durra of some Arab tribes and the Zurrut of others; its Indian origin is indicated by the Persian name, Jawur-i-Hindee. It is extensively cultivated throughout Asia, and appears to be the Tall Corn of the Chinese. It has been introduced into the south of Europe, where it is chiefly employed for feeding cattle and poultry, but it is also made in cakes. The flour is white, and a good deal resembles that of the Indian corn in nature.—*Eng Cyc.*

This is largely grown in the Chittledroog and in part of the Nuggur Divisions. It is sown during the thunder showers between the end of April and May; and the crop is reaped in September and October. The great defect in this grain is that it will not keep, being soon destroyed by insects; and the Ryots have difficulty in preserving sufficient quantity of it for seed on the following year. The seed grain is mixed with ashes, and packed with paddy straw; in spite of which, however, insects obtain admittance. The stems or straw of this grain when well preserved from rain, will keep for about ten years, and are used as fodder.—*M. E. of* 1857. This millet, of the Linnean genus Holeus, is often grown by the Karens, and occasionally by the Burmese. This is the millet designated in Ezekiel 4. 9.—*Mason.*

(7778) SORREL. This is grown by sowing the seed broad cast and thinning the plants to the distance of eight or ten inches from one another. It may be sown at the commencement of the rains.—*Riddell.*

(7779) SORREL. Rumex Acetosa. Used as spinach and salad, of little value, the French Sorrel, R, scutatus is a very delicate vegetable, of easy culture in light soil.—*Jaffrey.*

(7780) SOULAMIA (Soulamion is the name of the tree in the Moluccas), a genus of Plants belonging to the natural order *Polygalaceæ*. It has 5 sepals, the 3 outer ones very small, the 2 inner large and concave; the petal is concave; the capsule samaroid, indehiscent, compressed, corky, emarginate, and 2-celled.—*Eng. Cyc.*

(7781) SOULAMIA AMARA, Bitter Soulamia, is a shrub with crowded ovate leaves tapering to the base, quite entire, and veiny. It is a native of the Moluccas, and has white racemose flowers, the size of those of the vine. The fruit is compressed, thin at the edges, dry, with 2 seeds in each cell resembling cucumber seeds, but smaller, each lying in a small cavity of the cell. —*Eng. Cyc.*

(7782) SOUR SOP. Anona Muricata.

(7783) SOUSEE. *Hind.* is manufactured principally in the towns of Tanjore, Trichinopoly, St. Thomé or Mylapore. Those of Tanjore and Trichinopoly are made of silk and mixed with cotton of various colours and sorts; but Mylapore weavers work only in cotton: they are 7 yards by 1, the silk pieces are sold at from 8 to 20 Rs.; those of cotton at 2 to 7 Rs. each. These are used for undergowns, or Lungahs, by the Mahomedan females and as trousers for men.

(7784) SOUTHERNWOOD. Artemisia Abrotanum. This plant, of the same genus as wormwood, is seen in European gardens in Tenasserim.—*Mason.*

(7785) SOUTHERNWOOD. Artemisia Austriaca. Lin.

Downah, Hind.	Marikolundoo,
Dawanum, Tel.	Tam.

The Tamul people sometimes mix the fine powder of it with Gingilie oil and anoint themselves with it after bathing. The Mahometans prize it for its fragrance as a flower; and it is one of the many sweet smelling shrubs that are strewed before the Hindoo gods at religious ceremonies.—*Ains. Mat. Med. p.* 44.

(7786) SOY.

Soy. Chinese.	Soya, Japanese.

A peculiar savoury sauce, made from the *Soja*, a species of *Dolichos*, growing in the Eastern parts of Asia. Genuine soy is well flavoured, thick, brown, and clear; and when shaken in a glass, it should have a coat on the surface of a bright yellowish-brown colour. It is obtained from Canton; but the best is exported from Japan, by way of Batavia.—(*Waterston*) *Faulkner.* Soy, is made in some parts of the East, from a species of the Dolichos bean (soja hispida) which grows in China and Japan. In Java, it is procured from the Phaseolus radiatus. The beans are boiled soft, with wheat or barley of equal quantities, and left for three months to ferment, salt and water are then added, when the liquor is pressed and strained. Good soy is agreeable when a few years old, the Japan soy is superior to the Chinese. Large quantities are shipped for England and America. The Dolichos bean is much cultivated in Japan, where various culinary articles are prepared from it, but the principal products are a sort of butter termed mico, and a pickle called sooja. 1,108 piculs of soy were shipped from Canton in 1844, for London, British India, and Singapore. 100 jars, or about 50 gallons of soy, were received at Liverpool in 1850. The price is about 6s. per gallon in the London market.—*Simmonds' Commercial Products, page* 313. The best soy is made by boiling beans soft, adding an equal quantity of wheat or barley, and leaving the mass to ferment; a portion of salt, and three times as much water as beans, are afterwards put in, and the whole compound left for two or three months, when the liquid is pressed and strained. The flavour and ingredients of soy vary considerably, even among the people who make it, and much of that exported is supposed to be more or less adulterated.—*Williams' Middle Kingdom, Vol.* II. *p.* 402. Leguminous and cruciferous plants ocupy the largest part of the CHINESE kitchen garden; many sorts of peas and beans are cultivated, and the pods and seeds of two species of Dolichos are eaten, and the beans of another species made into soy by boiling and powdering the kernels and then fermenting them with yeast, and mixing other ingredients, according to the taste of the maker or purchaser.—*Williams' Middle Kingdom, Vol-* II. *page* 403. The widely diffused and extensive tribe of Leguminosæ holds an important place in Chinese botany, affording many esculent vegetables and valuable products. Peas and beans form important objects of culture, and the condiment called soy (a word derived from the Japanese soya), is prepared chiefly from a species of Dolichos. One of the commonest modes of making this condiment is to skin the beans, and grind them to flour which is mixed with water and powdered gypsum, or turmeric. The common Chinese eat few meals, without the addition of one form or other of the " bean" curd, or " bean" jelly. One genus of this tribe affords indigo, and from the bunds and leaves of a species of Colutea a kind of green dye is said to be obtained.—*Williams' Middle Kingdom, p.* 283.

(7787) SOYA, OR SOWA, Dill Seed, an Umbelliferous Plant cultivated in India. It is the *Anethum Sowa* of Roxburgh, of which the aromatic seed is much used by the natives in cookery, as well as for medicinal purposes; the green parts also are cut down, and sold in the bazars, as the plant is used as a vegetable both by Mussulmans and Hindoos. The seeds are the ' shubit of Avicenna, which is usually translated Anethum; by the Arabs it seems to have been considered the 'Ανηθον of Dioscorides.—*Eng. Cyc. Ben. Ph.* 226.

(7788) SOYMIDA, a genus of Plants belonging to the natural order *Meliaceæ*, named by A. Jussieu from the Telinga name of the tree, which was referred to *Swietenia*, and called *S. febrifuga*, by Dr. Roxburgh. This is a large forest-tree, a native of the mountainous parts of the Rajahmundry Circars, and likewise of the jungly places in general of the central parts of Hindustan. The genus is characterised by calyx 5-leaved, imbricate; petals 5, shortly clawed; stamen-tube cup-shaped, 10-lobed, each lobe bidentate at the apex; anthers 10, included within the tube and lodged between the teeth of the lobes; ovary 5-celled, seated on a broad disc; ovules numerous, pendulous from the centre of the cells; style short, stigma peltate, 5 cornered; capsule woody, 5-celled, 5-valved; seeds winged. The only species known attains a height of 80 feet with abruptly pinnate leaves. The inflorescence is a large diffuse and terminal panicle. —*English Cyclopædia, p.* 859. This tree which is called Rohuna in Hindustan is particularly noted on account of its bark. This is of a dull red colour, of a fibrous nature and astringent and has been much employed in India for the cure of intermittent fevers.—*Eng. Cyc. p.* 859.

(7789) SOYMIDA FEBRIFUGA. *Cedrelaceæ*, Roxb. C. 17. Swietenia febrifuga. *Syn.* Red wood, or Bastard Cedar.

Shem Marum or Choar	Soymeda. TEL.
Kullic Marum, TAM.	Woud Marum, TAM.
Rohuna, Rohitaka, HIND.	

A large forest tree, a native of several of the mountainous districts of India, in the Rajamundry Circars, the district of Cuddapah, the Chunar hills, and the jungles to the south of Hazareebagh. Royle, indeed, states that it occurs in all the central and southern parts of India. The bark of this tree has enjoyed much celebrity. Mr. Breton and others have spoken very highly of the efficacy of this bark in the treatment of periodical fevers. It seems to us to be exactly similar to the mahogany bark, useful where astringent tonics are applicable, but of very questionable efficacy as a true anti-periodic. Although we cannot advise its use in the treatment of obstinate or dangerous cases, still for mild ague, in which doubtless like all other astringent tonics it will often succeed, we commend it to be given in the form of the *extract* described in our officinal preparations.—*O'Shaughnessy, p.* 247-9. This, says Wight, is the Swietenia febrifuga of Roxb. and Ainslie, I have not seen the wood and only know of its existence in Coimbatore from Botanical specimens of the tree brought under that Native name. The wood is said to be most durable and strong.—*Wight. Soymida or Swietenia febrifuga*, is very abundant in Nagpore and Southern India. Rohun bark is an undoubted febrifuge but in the bazars in Bengal, Nux Vomica bark is often sold for it, and from this Mr. Piddington, who has shown much zeal in examining native febrifuges, procured a salt, which Dr. O'Shaughnessy found to be one of Brucine. Dr. O'Shaughnessy has never succeeded in obtaining an alkaloid from the tree Rohun, which it may be observed is of a dull red colour, with rough grey epidermis, and yields a red powder. The value of this bark as a febrifuge has been attested by Roxburgh, Duncan, Breton and Spilsbury. Dr. O'Shaughnessy does not think so highly of this bark as others do, not considering it much superior to that of its congener, Mahogany. He accounts it useful where astringent tonics are applicable, but of very questionable efficacy as a true antiperiodic; he thinks it may succeed where other astringent tonics will do so. From the reports of dispensaries I am inclined to have a somewhat higher opinion of this medicine and believe that it is of considerable use, though by no means equal to the Berberis. If the statement of the Madras report be accurate, its virtues may be more powerful than is supposed. The reporters say, "We have from our own experience found that when taken beyond the quantity of 5 or 6 drachms in the course of the day it produced vertigo and other head symptoms" This is confirmed by Dr. Spilsbury, who says large doses were found to produce vertigo.—*Ind. Ann. Med. Sci. for* 1856. *p.* 191.

(7790) SPARIDÆ, OR SPAROIDES, a family of Fishes belonging to the section *Acanthopterygii*, which are distinguished by the following characters combined, namely : the possession of a single dorsal fin, the anterior half of which is supported by spinous rays, and which is not divided, nor is it protected by scales ; the operculum is spinous, the palate destitute of teeth, the branchiostegous membrane has five or six rays, and the pyloric appendages are few in number. The body is usually of an ovate form and covered with large scales ; the mouth is not protractile. The species of this family feed chiefly upon the animals of small shell *Crustaceæ* &c., for crushing which their strong teeth are admirably adapted.

The genus *Pentapus* is founded upon certain Sparoid Fishes found in the India Seas, and off the coast of Australia, which approach the genus *Dentex*, but have two strong canine teeth in front of each jaw, between which sometimes are two or four much smaller teeth ; the other teeth are minute, prickly, close together, and arranged in a sigle row in each jaw.

Lastly, the genus *Crenidens* is distinguishable by the foremost row of compressed teeth being dilated at the apex and notched ; behind these are numerous small globular teeth There is but one species, the *C. Forskalii*, Cuv. and Val., an inhabitant of the Red Sea.—*Eng. Cyc.*

(7791) SPARAXIS. IRIDEÆ. This is a pretty species of Irideæ, and is cultivated by dividing the roots.—*Riddell.*

(7792) SPATHE (the Greek σπάθη). This term is applied to the sheathing involucrum of many plants. It is seen in the greatest perfection in the flowers of *Palmaceæ* and *Araceæ*, where, during the flowering of the plants, it embraces the entire inflorescence. This organ is considered by most botanists to be a modification of the bract.—*Eng. Cyc.*

(7793) SPATHIUM CHINENSE. SPATHIUM ROOT. In Tenasserim there are one or two species of Spathium, plants that grow in the water ; one of which Voigt says, is found on the banks of the Irrawaddy, and has roots "nearly as good as potatoes.."—*Mason.*

(7794) SPATHODEA, a genus of Plants belonging to the natural order *Bignoniaceæ.* The calyx is spathaceous, cleft and toothed or entire on the other side ; the corolla is funnel-shaped, with a 5-lobed rather unequal limb ; the four stamens are divided into two long and two short, with the additions of a fifth sterile filament ; the capsule silique-formed, falcate, falsely 4-celled, and corky ; the seeds are furnished with membranous wings ; the species are erect shrubs or trees, rarely climbing shrubs ; the flowers, somewhat panicled, orange colored, yellow, or purple. Dr. Wight gives Spathodea arcuata, 1340 ; and Rheedii, 1339.

(7795) SPATHODEA ADENOTHYLLA. A small introduced tree. Madras Hort. Garden.53.

(7796) SPATHODEA ARCUATA. *Bignoniaceæ*, Icon. 1340.

Ran pallay marum, TAM.

A medium sized tree frequent in the Wallar jungles. I do not know the wood, but judging from its relations—padre and vadencoonee—I infer it will be found good.—*Wight.*

(7797) SPATHODEA LONGIFLORA, is an arboreous plant, and has large spreading terminal panicles, a bilabiate corolla, long pendulous slender sub-cylindrical follicles, with sharp edges and variously curved ; the flowers are large yellow, and very fragrant ; the follicles very long ; the wood of this tree is high-coloured, hard, durable, and of much use amongst the inhabitants of the hills about the coasts of Coromandel and Malabar, where it is plentiful.—*Eng. Cyc.*

(7798) SPATHODEA RHEEDII has downy impari-pinnate leaves, roundish downy leaflets, terminal erect racemes, and a much-curved slender corolla ; the shoots are covered with a whitish down ; the racemes the length of the leaves ; the flowers white and pretty large ; the limb spreading ; the fruit about a foot long, pendulous, twisted in various forms.—*Eng. Cyc.*

(7799) SPATHODEA ROXBURGHII has its leaves three in a whorl or scattered imparipinnate ; the leaflets from 4 to 5, in pairs serrated and smooth ; the panicles erect, terminal, dense, downy, and many-flowered ; the fruit narrow and 4-celled ; the calyx generally 2 parted, with the upper lip 2-cleft and downy. It is a native of the Circars. The branches are very spreading ; the back gray, with a few scabrous spots ; the flowers large, rose-coloured, and delightfully fragrant ; the limb of the corolla nearly equal, and elegantly waved at the edges This species is remarkable on account of its serrated leaves. The wood is employed for many purposes by the natives.—*Eng. Cyc.*

(7800) SPATHODEA UNCINATA. BIGNONIACEÆ.—This genus of plants are showy and handsome, the colour of the flowers being yellow, purple, and red : they are easily propagated by seed or cuttings, and require a good garden soil.—*Riddell.*

(7801) SPATTALLA. Proteaceæ.—This genus are all Cape plants, and require the same treatment as others Proteaceæ.—*Riddell.*

(7802) SPEAR-MINT. Mentha viridis. Cultivated for the fragrant leaves, which are used in sauces, tea, &c., requires rich soil, shade and plenty of water, propagated by division of the plant.—*Jaffrey.*

(7803) SPELTER, Zinc, Tutenague.

Pi-yuen, Chin.
Zinc, Fr.
Zink, Ger.
Sungbusrie, Duk.
Jussud, Guz. Hind.
Zincum, Lat.
Zinco, It.

Dasta, Nep.
Jussud, Pers.
Schpiauter, Rus.
Zinco, Cinck, Sp.
Tootoo nagum, Tam. and Tel.

A metal of a blueish-white colour and lustre. Being cheap, light, and a metal which, when superficially oxidized, long resists the further action of air and water, it is now employed as a substitute for lead in lining water cisterns and roofings: alloyed with copper it forms brass; and several of its compounds are used in medicine. Zinc is obtained either from *Calamine*, a native carbonate, or *Blende* a native sulphuret: it has never been found in a state of purity. Localities, Great Britain, China, Germany.—*Faulkner.* *Spelter*, is in China used in the manufacture of brass; it is in plates of half an inch thick of a whitish-blue color. There was formerly a monopoly of spelter, so that no foreigner could either buy or sell it; the consumption may perhaps increase a little under the new arrangement, but the native tutenague and white copper will probably prevent much consumption of foreign spelter.—*Morrison.*

(7804) SPERMACETI.

Blanc de Baleine, also Sperme de Baleine, Fr.
Wallrath, Ger.

Spermaceti It.
Spermazet Rus.
Esperma de Ballena. Sp.

The produce of a species of whale *Physeter macrocephalus*, found chiefly in the South Seas. It is characterised by a large head, great part of which is occupied by a triangular cavity filled with a white oily substance, which, after its death congeals into an unctous mass, and from which a considerable quantity of oil may be obtained by expression. The residuum is a concrete fatty substance called spermaceti, which, after being purified, is cast into blocks or cakes. These are of a white colour, have a peculiar lustre, are transparent, brittle, smooth, but not greasy; smell-peculiar, but weak. Spermaceti burns with a brillant flame, without smell; and is used in the manufacture of candles; also for medical purposes.—*Faulkner.* The *Physeter macrocephalus*, called the Cachalot, or White Whale, is of immense size, frequently 60 or more feet in length, of which the head constitutes one-third. This part is the chief reservoir of the spermaceti, which however is found in several other parts of the body, mixed with the sperm oil. It is mostly lodged in two large cavities of the upper jaw, one above and the other below, divided from each other by the nostrils. These cavities are subdivided into numerous cells of unequal size by ligamentous or tendinous partitions; these partitions are of the same nature as those which separate the fat in other animals, but, owing to the great size of the creature, of a larger and stronger kind. The purest spermaceti is contained in the largest and least ligamentous cells. The part in which it is lodged is quite distinct from the cranium containing the brain, which spermaceti was at one time supposed to be. During the life of the animal the spermaceti is in a fluid state, and on the head being open has the appearance of an oily clear white liquid. On exposure to the air the spermaceti concretes and deposits from the oil. They are then separated, and put into different barrels.—*Eng. Cyc.*

(7805) SPERMACETI-WHALE. Cetacea.

(7806) SPERMADICTYON, a genus of Plants belonging to the natural order *Rubiaceæ*, named from σηέρυα, seed, and δικτυον, a net, from the manner, in which the seeds cover the placenta. The genus is characterised by having the calyx-tube ovate, 5-partite, persistent: corolla densely pubescent; tube long, straight, 5-lobed; stamens 5, included within the corolla-tube; stigma 5-cleft; capsule crowned by the calyx, contains 5 nuts. The species form shrubs, with white and light blue very fragrant flowers, with leaves lance-shaped, shortly petioled; stipules short. They are natives of Hindustan. *S. suaveolens*, the *S. Hamiltonia* of Roxburgh, ascends the Himalayas to elevations of 3000 feet, and has been cultivated in Great Britain as a stove-plant.—*Eng. Cyc.*

(7807) SPHENOCLEA, a genus of Plants belonging to the natural order *Campanulaceæ*, consisting of only a single species. The genus is characterised by having a superior 5-parted calyx with inflexed segments. Corolla 5-parted, with the segments inflexed and somewhat auricled at the base, and which conceal the 5-sessile stamens; ovary inferior; style very short and 2-lobed; capsule membranous, many-seeded, with a central fungous placenta, circumsessile; seeds minute, embryo without albumen, straight, with the radicle next to the hilum. The only known species, called *S. Zeylanica*, is an annual, with alternate entire leaves, without stipules; found in marsh situations in all parts of India. It is sometimes made the type of an order.—*Eng. Cyc.*

(7808) SPHÆRANTHUS. Of this genus, Wight gives Sphæranthus amaranthoides, 1149; and hirtus 1094.

(7809) SPHÆRANTHUS INDICUS. Indian Sphæranthus.

Kottangkarundei, Tam.
Moondie, Duk.
Dookkon, Arab.

Bodatarum, Tel.
Moondee, Sans.

The small oblong seeds and receptacles of this low growing herbaceous plant (2) are reckoned by the Vyteans amongst their anthelmintics and are prescribed in powder. Rheede tells us that the powder of the root is considered as stomachic, and that its bark ground small, and mixed with whey, cures the piles.—*Ains. Mat. Med. p.* 85.

(7810) SPHÆRANTHUS MOLLIS: SOFT. GLOBE FLOWER.

Gork-mundi. HIND.

Common near the Ana-sagur; used by the natives in medicine.—*Gent. Med. Top. p.* 135.

Sphæranthus Mollis and Indica, are common near water banks at Ajmeer: S. mollis has a round pink blossom: considered heating: cleanses the blood: aphrodisiac: also opens the bowels: the flower and seed capsules are used.—*Genl. Med. Top. p.* 206.

(7811) SPHÆROCARYA, a genus of Plants belonging to the natural order *Rhamnaceæ*, so named from σφαιρα, a sphere, and καθυον, a nut. The species forms moderate-size trees in Nepaul. The calyx is 5 parted. Petals 5 and alternate with the 5 stamens, which, like the petals are inserted into the calyx, and with 5 fringed scales placed between the stamens, and opposite the calycina segments. Drupe pear-shaped, containing a smooth round nut.—*Eng. Cyc.*

(7812) SPHÆROCARYA EDULIS, is so called from its fruit being eaten and relished by the Nepaulese, though not very palatable to a European taste. This tree is a native of the forests of Nepaul, and has alternate, ovate-entire, exstipulate leaves, with axillary and terminal villous racemes of small greenish-coloured flowers, which are without odour.—*Eng. Cyc*,

(7813) SPHÆROCOCCUS, a genus of plants belonging to the natural order *Algæ*. It was formed by Stackhouse, and applied to the plants belonging to it, on account of their globose fructification. A great number of species of this genus have been described including amongst them some of the most useful of the sea-weed tribe. These species have been distributed by later botanists into the genera *Rhodomenia*, *Gigartina*, *Chondrus*: *Gelidium*, and *Phyllophora* and the genus *Sphærococcus* has only one species, the *S. coronopifolius*. The genus *Chondrus* affords the Carrageen Moss, which is so much used as an article of diet. It is a species of *Gelidium*, with which, as some assert, the swallows build their nests in the Eastern Archipelago and which are so highly valued as articles of food by the Chinese.—*Eng. Cyc.* The gelatinous substance of which the nests are composed, however, seems, really, to be a natural secretion from the swallow itself.

(7814) SPICES.

Speceryen, DUT.
Epiceries, Epices, FR.
Spezereyen, GER
Gurm-mussala, GUZ. HIND.
Spezj, Spezierie, IT.
Especiaria, PORT.
Pranuc korenja, RUS.
Especias, Especerias. SP.

Under this denomination are included all those vegetable productions which are fragrant to the smell, and pungent to the palate: such as cloves, ginger, nutmegs, cinnamon, allspice, cardamoms, &c.—*Faulkner.* Spices and condiments are largely employed by the people of India. Some are imported and many of them are exported to a considerable extent. They are obtained from the barks, the dried seeds, the fruit, flower-buds, and root-stocks of different plants. The chiefly aromatic barks are the Cinnamon and Cassia lignea; the seeds and fruits include Pepper, Cardamoms, Coriander, Cummin seed, Star anise, nut-megs and chillies. The flower buds of some furnish cloves and cassia buds, and the roots supply ginger, and turmeric. The English and botanical names of the principal of the series are given below, and their descriptions will be found under their several heads.—*Madras Exhibition of* 1857. *English Cyclopadia*, *Simmonds.*

Areca or betle nut,	Areca catechu.
Betle leaf or pan,	Piper betle.
Cassia bark, ...	Laurus cassia.
Cassia buds, ...	Cinnamomum iners.
Cinnamon, ...	Cinnamomum aromaticum.
Cloves,...	Eugenia caryophyllata.
Mace & nutmegs,	Myristica moschata.
Cardamoms, ...	Elletaria cardamomum.
Do. wild,...	
Pepper, ...	Piper nigrum.
Do. long,...	Piper longum.
Chillies, ...	Capsicum, (var. sp.)
Ginger, ...	Zingiber officinale.
Turmeric, ...	Curcuma longa.
Coriander, ...	Coriandrum sativum,
Cummin, ...	Cuminum cyminum.
Mustard, ...	Sinapis, (var. sp.)

(7815) SPIDER-WORTS. Several species of spider-worts are abundant in Tenasserim. One *Commelyna cæspitosa*, a creeping species of commelyna may be often seen trailing up the sides of fences. Another with blue flowers like the former, but with a different habit, is sprinkled among the grasses at almost every door. The latter belongs to the genus aneilema, *Aneilema herbaceum.* There are also one or two other species common. but I do not find them described.—*Mason.*

(7816) SPIGELIA, a genus of Plants belonging to the natural order *Spigeliaceæ*. It is commemorative of Adrian Spigelius. The characters of this genus are:—Calyx 5-parted; corolla funnel shaped, with a 5 cleft equal limb; anthers converging: capsule didynamous, 2-celled, 4-valved many-seeded. This genus consists of annual and perennial herbs, and under shrubs with opposite leaves and rose coloured or purple flowers. They are natives of North and South America, and are found in various soils.—*Eng. Cyc.*

(7817) SPIGELIA MARYLANDICA. CAROLINA PINK, PINK ROOT, INDIA PINK A perennial, herbaceous, medicinal plant, (*S. Marylandica*), a native of S. America. The part chiefly valued is the root, which, in its newly dried state, is celebrated as an anthelmintic. It has a bitter nauseous taste, and a tea-like smell.—*Faulkner*.

(7818) SPIKENARD.

Sunbul-ul-Teeb, Arab.
Bal-chur, Beng. Hind.
Jettamansi, Chebur, Guz.
Sattamansi, Sans.
Shad-a-mangie, Tam.
Jettamassie. Tel.
Narden also Nardos, Greek.
Nardoom, Lat.

The root is of a blackish colour, and resembles the bushy tail of the Ermine. Its odour is strong and fragrant; and it is much esteemed by all Eastern nations. The plant is a native of the mountains of the north of India, at very great elevations; and the roots are also brought to India from the Persian Gulf.—*Faulkner*. Spikenard is a substance which has enjoyed celebrity from the earliest period of the world's history, and has engaged the attention of numerous commentators on the works of the ancients, as well as of some modern authors. It is interesting therefore not only as making us acquainted with one of the substances known to and esteemed by the Greeks and Romans, but it is important likewise as being mentioned in the Bible, since the Nard of Scripture is supposed to be the same substance as the Nardos of the ancients called also *Nardostachys* (ναρδόσταχυς) and hence Spikenard, the word Stachys being rendered by the word Spike. Dioscorides, in the first chapter of his first book, treats of the various aromatic and stimulant substances which were known to the ancients, and among these of the various kinds of Nard. Of the first kind, called simply Nardus (νάρδος), there are two varieties, the one Syrian, the other Indian; the former so called, not because it comes from Syria, but because the mountains in which it is produced have one part turned towards Syria and the other towards India. This may refer either to the Hindu-Kush, or to so many Indian products finding their way to Syria, by the way of the Red Sea and the Euphrates, from the earliest times. The other variety is called Gangitis from the river Ganges, near which, while flowing round a mountain, it is produced, bearing many hairy spikes from one root. These are strong-smelling, but those growing in moist situations less so than those found on the mountains. One variety, he further says, is called Sanpharitieon, from the name of a place. This first kind being called Nardus, and distinguished into the Syrian and Indian varieties, the second kind he calls Celtic Nard (νάρδος Κελτική), and the third kind a Mountain Nard (νάρδος ορεινὴ) On consulting Avicenna, we are referred from Narden to Sunbul, pronounced Sumbul, and in the Latin translation from Nardum to Spica, under which the Roman, the mountain, the Indian, and Syrian kinds are mentioned. This proves, as has been already stated by Sir William Jones, that Sunbul, &c, was always considered by Arabian authors as synonymous with the Nardos of the Greeks. In Persian works on Materia Medica, all translated from the Arabic, as, for instance, the 'Mukhzun al-Adwieh,' or 'Magazine of Medicines,' we have four different kinds of Sunbul:— 1, Sunbul Hindee; 2, Sunbul Roomee, called also Sunbul Ukletee, and Narden Ukletee, evidently the above Celtic Nard, said also to be called Sunbul Italion, that is, the nard which grows in Italy; 3, Sunbul Jibullee, or Mountain Nard: hence it is evident that the kinds described by Dioscorides are alluded to, and in fact the accounts given are merely translations of his descriptions. The fourth kind of Sunbul appears to be a hyacinth or polyanthus. But the first is that with which alone we are at present concerned. The synonyms given to it are—Arabic, Sunbul-al-Teeb, or Fragrant Nard; Greek, Narden; Latin, Nardoom, and Hindee, Balchur, and Jatamansee. Having the Hindee and Sanscrit names of an Indian plant, the next step was to obtain it. This was first attempted by Sir William Jones, at a time when we had no access to the Himalayan Mountains, and a wrong plant was sent him. Dr. Royle informs us that on making inquiries on the subject, when at Saharunpore, in 30° N. lat., about 30 miles from the foot of the Himalayas, he learnt that Jatamansi, better known in India by the name Bal-Chur, was yearly brought down in considerable quantities from the mountains, such as Shalma Kedarkanta, near the Ganges and Jumna rivers, to the plains. Having obtained some of the fresh brought down roots, he planted them both in the East India Company's Botanic Garden, and in the mountains, in a nursery attached to it. The plant produced was found to belong to the natural order *Valerianaceæ*, and has been named *Nardostachys Jatamansi* by De Candolle, and formerly *Patrinia Jatamansi* by Mr. Don, from plants sent home by Dr. Wallich, from Gossainthan, a mountain of Nepal. Mr. Don obtained the additional corroboration that Spikenard bought in a chemist's shop by this name exactly corresponded with the roots of the Jatamansi. (Royle, 'Illust. Himalayan Bot.,' p. 242.) Hence there can be no doubt that the Nardos described by Dioscorides is the Jatamansi of the Hindoos, and probably the same substance which has been mentioned by such writers as Hippocrates; and there is nothing improbable in its being the Nard of Scripture, and it has been shown to be a plant belonging to the natural order *Valerianaceæ*. It is curious that the Celtic and mountain nards are also Valerians, the former being yielded by *Valeriana Celtica* and *V. Saliunca*, still exported from the mountains of

Austria to Egypt, whence it has spread into both Africa and Asia, being valued for its fragrance, and hence employed in perfuming baths; and the other by *V. tuberosa.* Dr.Royle mentions it as a curious coincidence, if not allowed to be a sign of accurate knowledge, that the Persians should translate the φυ of Dioscorides, which he also calls Wild Nard, Foo of the Arabians, by the term Bekh-i-Sunbul, Root of Soonbul. The plant correctly ascertained by Sipthorp has been named by him *Valeriana Dioscoridis.*

(7819) SPILANTHES ACMELLA. This species of spilanthes is planted by the natives of Tenasserim for its medicinal properties.—*Mason,*

(7820) SPINACIA, a genus of Plants belonging to the natural order *Chenopodiaceæ.* This genus is diœcious, the male and female flowers being on different plants; the male flowers are composed of a calyx, with 5 deeply cloven concave oblong obtuse segments; 5 stamens, with filaments longer than the calyx, with oblong double anthers. The female flowers have a monosepalous calyx, with four divisions, two of which are smaller and opposite; a superior ovary with 4 styles and simple stigmas. As the fruit ripens the calyx hardens and adheres to it. The ovary contains a single seed. There are only two species, which are herbaceous plants with alternate leaves, and axillary flowers of a green colour.

(7821) SPINACEA OLERACEA, THE COMMON SPINACH.

Vusayley-keeray, TAM.

Is well known on account of its use in the kitchen. It has an herbaceous stem one or two feet high, branched, and hollow; arrow-shaped leaves; male flowers in long spikes, abounding with pollen; female flowers on another plant, axillary, herbaceous, and small. The fruit is a small round nut, which is sometimes very prickly.—Both Spinacea oleracea and New Zealand spinach are commonly cultivated in all gardens.

Spinach is used as a culinary vegetable. It grows in rich soil, requires plenty of water, should be sown thinly in drills or broad cast every month or six weeks, may be had during the hot months in sheltered situations, with attention to water.—*Jaffrey.*

(7822) SPINACIA TETRANDRA.

Choolaee, HIND.

This Hindustanee name is indifferently given to Spinacia Tetrandra, Tetrandous Spinach and Amarantus polygamus. The former is a common sort of native greens, and, when boiled, resembles spinach; it is procurable nearly all the year round. The latter is much cultivated by the natives. It is sown broad-cast in beds from June to March. The leaves are sold in the bazar at one pice the seer. Used as a greens and also in curries.—*Riddell, Jaffrey.*

(7823) SPINAGE, NEW ZEALAND. Is a hardy annual, with fleshy leaves and numerous branches. As a spinage it is as valuable as the Orache. If watered, grows freely, and produces leaves in the hottest weather.

(7824) SPINEL occurs crystallized either in regular octahedrons, or in macles presenting different forms. It is of various shades of red, violet, or yellow, more rarely black. By lapidaries, the scarlet coloured, is termed *spinel ruby*; the rose-red, *balas ruby*; the yellow or orange red, *rubicelle*; and the violet-coloured, *almandine ruby.* The first is the most valuable. Spinel is not so hard as the oriental ruby; and is readily distinguished both by its colour and crystallization. Principal localties Sweden, Ceylon, Malay Peninsula.—(*Walerstone*) *Faulkner.* According to the English Cyclopædia *Spinell Spinell Ruby, Balas Ruby Ceylanite Candite* &c., is a Mineral occurring in loose and imbedded octohedral crystals. Primary form the cube. Cleavage easy, parallel to the faces of the octohedron, of the black opaque variety; difficult in the other varieties. Fracture conchoidal. Hardness greater than that of quartz, but less than that of corundum. Colour red, blue, violet, green, yellow, brown, and black. The first is the most common. Streak white. Lustre vitreous. Transparent, translucent, opaque. Specific gravity 3·5 to 3·7. Infusible by the blow-pipe; the red varieties are rendered black and become opaque by exposure to it, but on cooling, at first of a fine green by transmitted light, then nearly colourless, and at last become again red. Spinell is found in Ceylon and Siam in isolated and rolled crystals in the beds of rivers. It is found embedded in carbonate of lime in North America and Sweden. Several varieties have been analysed; red transparent spinell by Vauquelin; blue, by Berzelius; green and black, by Dr. Thomson:—

	Red.	Blue.	Green.	Black
Silica,...............	—	5·48	5·62	5·59
Alumina,....... ,....	82·47	72·25	73·39	61·78
Magnesia,..........	8·78	14·63	13·63	17·86
Protoxide of Iron,.	—	4·26	7·42	10·56
Lime, ...	—	—	trace	2·81
Chromic Acid,.....	6·18	--	—	—
	97·43	96·62	99·97	98·60

(7825) SPIRÆA, a genus of Plants belonging to the natural order *Rosaceæ* tribe *Spiraceæ.* The name occurs in ancient authors, and is supposed to be derived from σπεῖρα, a cord, in allusion to the fitness of the plants for twisting into garlands. The genus is diffused through the temperate parts of the northern hemisphere, and is characterised by having a 5-cleft permanent calyx; stamens 10 to 50, inserted in a torus with the 5 petals, which are inserted into the calyx; carpels sessile, solitary or several rarely connected into a capsule; seeds 2-15, pendulous, very rarely ascending. The species, upwards of 50 in number, form small unarmed shrubs or perennial herbs: leaves usually simple, sometimes pinnately cut; flowers white or reddish. They are found in Europe, North America, Siberia, China, and the Altai and Himalayan Mountains. —*Eng. Cyc.* Fortune mentions amongst Chinese shrubs the *Spiræa callosa* and *Spiræa Reevesiana*.

(7826) SPIRITS.

Daroo Guz. Hind. | Shurab, Pers.

All inflammable liquids obtained by distillation, as brandy, rum, geneva, whiskey, &c, are comprised under this designation.—*Faulkner*.

(7827) SPOGEL SEED. PLANTAGO ISPAGHULA.

Ispagool, Pers.
Buzr kaloona, also Buzrav-kotuna, Arab.
Esubgool, Ispagool, Duk. Guz. Hind.
Fushoon, Greek.
Ispoghul Verei, Tam.

The seed of a plant (*Plantago Ispaghula*), grown in the upper provinces of India, Guzerat, Persia, &c. The seeds are of a very cooling nature, and form a rich mucilage with boiling water, which is much used by native practitioners, and occasionally by European medical men in India, in cases with inflammation of mucous membranes. The seeds met with in Bombay are brought from the Persian Gulf, Guzerat, and Sonmeeanee.—*Faulkner*. In India the Plantago Ispaghula is cultivated during the cold season for the seeds, which are used as an emollient and light article of diet for convalescents —*O'Shaughnessy, page* 510. In making a decoction of Ispaghool take of Ispaghool seeds two drachms, distilled water one pint. Boil and strain: this preparation is a simple demulcent. That of Ispaghool is used in dysenteries, and recommended by Mr. Twining.—*Bengal Phar. p.* 277.

(7828) SPONDIACEÆ, a natural order of Plants belonging to the Syncarpous group of Polypetalous Exogens. It has unisexual flowers; a 5-cleft regular calyx; 5 petals, inserted under the disc; 10 perigynous stamens arising from the same part as the petals; superior sessile ovary, 25-celled, with 5 very short styles and obtuse stigmas; one ovule in each cell. Fruit drupaceous. Seeds without albumen. The plants of this order are trees without spines, having alternate unequally pinnate leaves without pellucid dots. The flowers are arranged in panicles or racemes. This order was formerly included in *Terebinthaceæ*, but has been separated by Kunth and Lindley, on account of their syncarpous fruit and the absence of a resinous juice. The real affinity of *Spondiaceæ* appears to be with *Aurantiaceæ*, from which they differ in little beyond their perigynous stamens and the absence of dots on their leaves. They are natives of the West Indies, the Society Islands, and the Isle of Bourbon. The fruit of some of the species of *Spondiaceæ* is eatable, and is known in the West Indies by the name of Hog-Plums. —*Eng. Cyc.*

(7829) SPONGIA, the generic name under which Linnæus and many subsequent systematists have ranked the very numerous forms of organisation analogous to the sponges of commerce. Generally, and we think justly, zoologists have claimed these organisations for the animal kingdom, and ranked them among the *Zoophyta*; but there are eminent writers who dissent from this view on different grounds, and prefer to rank the marine and freshwater sponges with plants. For in regard to their constituent structure, they are composed, as so many of the *Polypifera* are, of a firm horny or stony skeleton immersed in a soft gelatinous living mass: in respect of the aspect of these two substances, the resemblance which they offer to *Alcyonia* appears very strong, with their external forms, uncommonly varied, sometimes resemble *Alcyonia*, often approach to *Palmipora*, frequently to *Pavonia*, *Agaricia*, and other forms of Lamelliferous *Zoophyta*. The currents of water which pass through the canals of their substance are analogous to many operations among *Polypifera* and *Mollusca*, and depend on similar ciliary organs, which have been detected in situ in *Grantia ciliata*. As however they contain no *Polypi*, it is difficult to rank them under the *Polypifera*. Dr. Johnson omits, in his excellent work on British *Zoophyta*, the sponges; and the following summary of his reasons deserves attention:— "If they are not the productions of Polypes, the zoologist who retains them in his province must contend that they are individually animals, an opinion to which I cannot assent, seeing that they have no animal structure or individual organs, and exhibit no one function usually supposed to be characteristic of the animal kingdom. Like vegetables, they are permanently fixed; like vegetables they are non-irritable; their movements, like those of vegetables, are extrinsical and involuntary; their nutriment is elaborated in no appropriated digestive sac; and, like cryptogamous vegetables or algæ, they usually grow and ramify in forms determined by local circumtances, and if they present some peculiarities in the mode of the imbibition of their food, in their secretions, yet even in these they evince a nearer affinity to plants than to any animal whatever." On this we may remark, that very many animals are as permanently fixed as sponges; that irritability is not to be looked for in every part of a sponge any more than in a *Rhizostoma*, whose divided digestive cavities are very unlike ordinary stomachs; and that the forms of sponges include remarkable analogies with the supports of *Polypi*. It is to our countrymen Ellis and Grant that the history of sponges is most indebted. The former established the existence and nature of the currents of water which pass through the substance; and the latter, besides confirming the results of Ellis, added a vast quantity of new and valuable observations. Mr. Bowerbank has contributed precise information regarding both the fossil and recent sponges. (Ellis, 'On Corallines;' Grant, 'On Sponges,' in 'Edinburgh Philosophical Journal;' Bowerbank, 'Geological Proceeding,' 1840; and 'Microscopical Journal,' 1841.) Sponges may be thus characterised: They consist of an albuminous skeleton and gelatinous matter, forming a mass not irritable, with numerous holes, connected internally with anastomosing canals. The skeleton is either simple, consisting of horny fibres, as the species so commonly used for domestic purposes; or compound, being strengthened by calcareous or siliceous spicula. Some of the skeletons of sponges are entirely horny; others are entirely siliceous; some are entirely calcareous; but the greater number are compound, and consist of horny matter with additions of spicula in various proportions. The gelatinous matter, abounding in horny matter and transparent globules, connects the different parts of the skeleton and membranes, lines the various canals, and forms the margins of the openings. The pores are minute openings (on the surface) with a gelatinous margin, strengthened or defended by the skeleton or specula, into which the water enters in currents, generated probably by a ciliary apparatus, which, however, has not yet been detected by the microscope, except in *Grantia ciliata*. The water, after traversing the interior canals, is ejected by means of orifices which are larger than the pores, and in many species are elevated above the surface in the form of tubular prolongations of the canals. The ova are numerous, at first appearing like groups of minute irregularly shaped opaque granules, derived from the gelatinous matter, which unite into ovate bodies, falling at maturity into the canals, and are expelled by the orifices. These ova float in the water, and exhibit spontaneous motion by the rapid action of the cilia, which cover the anterior portion of the body, at length attach themselves, and then expand into the forms of maturity. The currents from the orifices are best examined by placing the recent animal in a shallow dish of water, and throwing a little powdered chalk on the surface, the motion of which will indicate the direction of the streams. For the purpose of examining the skeleton, it is requisite to macerate the sponge in hot water, which removes the gelatinous matter, and leaves the skeleton in a state fit to be examined under a microscope. When the spicula are siliceous, the animal matter may be removed by nitric acid, or by combustion, as was practised by Müller ('Zool. Dan,' t. 85), when the vitreous needles will appear unaltered. The gelatinous substance of sponges is scarcely capable of conservation. It is usually of a ropy consistence, sliding off from the skeleton, or else pressed off by the divers for sponge. It is of various colours, but commonly fawn-coloured, or orange-coloured; in this respect resembling the gelatinous parts of *Polypiaria*. Horny Sponges with anastomosing fibres, fit for domestic use belong mostly to warm zones of the sea; sponges with calcareous spicula are rather numerous on the British coasts; and siliceous spicula are common in the sponges of most latitudes [SPONGIADÆ.] Remains of both horny and spicular sponges occur in a fossil state.—*Eng. Cyc.*

(7830) SPONDIAS ACUMINATA.

Ambut, DUK.

A middle sized elegant tree, with shining leaves; fruit the size of a small egg.—*Riddell*

(7831) SPONDIAS DULCIS. The Otaheite apple, much cultivated in the Society Islands. Introduced into Bombay.—*Riddell.*

(7832) SPONDIAS MANGIFERA.

Mirreymangi-kai, TAM.	Ambara also Amra, TEL.
Ambalam, RHEED. HIND. and BENG.	AMATAM.

The Hog-plum. The leaves of this tree are used in the preparation of chatnies. The green fruit used as pickles.—*Jaffrey.* The hog plum is a large tree with pinnate leaves; deciduous in the cold weather; they have a peculiar smell when bruised: the fruit is acid, and only used in curries.—*Riddell.* *Spondias Mangifera* is cultivated generally by the Burmese in groves near large towns. The tree grows to a considerable size and yields abundant seed.—*McClelland* Hog's plum, is an intensely astringent fruit very appropriately named. The Karens have a tradition that in those Golden Days when God dwelt with men, all nations came before him on a certain day, each with an offering from the fruits of their land, and the Karens selected the hog's plum for their oblation; which gave such offence, that God cursed the Karen nation and placed it lowest among all the nations by whom they are surrounded.—*Mason.* The wood of this tree is soft and of little if any use. From wounds made in the bark at the beginning of the hot season very large quantities of transparent juice issue, which soon hardens into a mild insipid gum very like gum arabic. The fruit is eaten raw when ripe, and before ripe is pickled, put into curries, made into tarts &c.—*Rhode, M.S.S*

(7833) SPONGE, SPONGIA OFFICINALIS.

Isfeng, ARAB.	Spungia, IT.
Eponge FR.	Uniwatta, JAP.
Schwamm, GER.	Abermoordeh. PERS.
Mooabadul, GUZ. HIND.	Esponja, SP.

A soft, light, very porous, compressible substance, readily imbibing water, and as readily giving it out again; and now ascertained to be a species of zoophite. The colour is generally yellow or brown.—*Faulkner.* The Officinal Sponge is so well known for its economic uses, that it does not require a detailed description. Numerous species are known, with soft porous bodies, traversed by tortuous canals; but the officinal Sponge is imported from the Mediterranean and Red Sea; some of the coarser kind from the West Indies. Those of the British Seas would probably answer equally well for burning. When collected, Sponge contains numerous small fragments of corals and minute shells, from these it must be freed before it can be used. Sponge is composed of Gelatine and Coagulated Albumen. (*Hatchett.*) When burnt, its ashes give Carbon, and some Silex, Carbonate and Phosphate of Lime, Carbonate of Soda, Chloride and Iodide of Sodium, Bromide of Magnesia, with a little Oxide of Iron.—*Royle.*

(7834) SPRAT. BRISTLE-FINNED SPRAT. SETIPINNA. A small fish of the herring tribe found in Burmah seas. It is, however, easily distinguished by a long filament or bristle, which is attached to each pectoral fin. This and another species are often called sprats by Europeans, and they belong to the same tribe.—*Mason.*

(7835) SPRINGS. The Tenasserim Provinces are well supplied with hot springs; and some of them are probably not inferior in their medicinal qualities to the fashionable Spas of Europe and America. Though their waters have never been subject to any minute analysis, yet we know there is a great variety in the properties of different springs. They may be arranged in three different classes,—carbonated, sulphureous, and saline.

Carbonated thermal springs.—The hot springs on the Ataran, according to Dr. Helfer's description, belong to the carbonated class. They are situated within two miles of the old town of Ataran, and Dr. Helfer writes: "There are ten hot springs or rather hot water ponds, of which I could only examine the nearest, as the access to the others was through deep water at 130° Fahrenheit This one was a semicircular pond about fifty feet in circumference. In one place it was thirty-five feet deep. The quantity of carbonic acid which the springs evolve, seems to render the neighborhood peculiarly adapted to support vegetable life. —The ground around the spring is strongly impregnated with iron, and the water which runs over the ochre mud has a strong styptic taste. The springs on the Ataran approach in their composition nearest to the celebrated waters of Teplitz. "Their medical properties would render them excellent remedies in a number of diseases: liver complaints would find a powerful remedy in them. If Amherst should be selected as a resort for invalids, the hot springs on the Ataran could easily be turned to advantage. In a direct line, they would be only four or five hours distant, and a road could be cut through the country without difficulty, so that patients could be removed there and bathe in loco." Dr. Morton found on analysis, that the waters contain a considerable quantity of calcareous matter, and that the tufa, which it deposits on the border of the springs, is a carbonate of lime. They appear to arise from the mountain limestone, and thus to hold a geological position similar to that of the hot springs of Great Britain, most of which rise from strata below the coal, and hence from, or through the limestone.

Sulphureous thermal springs.—About four miles below Matah at the forks of the Tenasserim, and a few miles north of the latitude of Tavoy, there are hot springs highly charged with sulphuretted hydrogen gas, so readily recognized by its smell which is precisely that of the washings of a gun barrel; the odor in both instances being produced by this same gas All the stones in the springs are of a bright brass color, produced apparently by the deposition of the sulphur; and although the virtues of these waters are hidden from man, they appear to be well known to the beasts of the forest. To judge from the tracks around in the morning, the most incongruous parties are held here every night. The delicate little tread of the chevrotain and barking deer, are seen side by side with the massive steps of the elephant and rhinoceros; and the tiger, and the leopard seem to lay aside their fierceness, and peaceably walk away satisfied with a draught of the much coveted beverage. Dr. Helfer said these springs belonged to "the class of sulphureous mineral waters, tinged slightly with chalybeate, like the water of Brighton." Their heat above the atmosphere is not great. Mr. Bennett at a recent visit, found the thermometer to rise in the hottest spring to only 119°. They rise from the slate rocks, like the warm springs of a considerable part of Germany.

Saline Thermal Springs.—On the margin of the granite range east of Tavoy, either near the junction of the slate and granite, or in the granite itself, is a series of the hottest springs in the Provinces. I have visited, says Mr. Mason, four or five in a line of fifty or sixty miles, and found them uniformly of a saline character Around one nearly east of Tavoy, the stones are covered with an efflorescence resembling epsom or glauber salt. Mr. Bennett found the Thermometer in this spring, to rise to 144°. Major McLeod visited one of the series at Palouk, and writes: "There are two spots where the springs show themselves. One immediately in the right bank of the river, and another two or three minutes walk to the northest inland.—There must be 30 or 40 bubbling up along a line of about 50 feet by 20.—The hottest was 196°

another 194°. No disagreeable smell or taste." The hottest springs are at Pai, ten or fifteen miles north of those visited by Major McLeod, and according to Phillips they are hotter than any on record out of volcanic regions, with the questionable exception of three springs in China, which, " probably exceeded the temperature of the air from 70 to 120 degrees." The principal spring at Pai,--for there are several,—is in a little sandy basin in the midst of granite rocks on the margin of a cold-water stream, where it bubbles up from three or four vents, and on immersing the thermometer into one, the mercury rises to 189°, within fourteen degrees of boiling water. Its location is rather peculiar, not being in a valley like the others I have seen, but on the side of a hill more than a thousand feet above the level of the sea, and surrounded by large masses of coarse grained granite rocks, which seem to have been detached from the summit above.—*Mason.* See MINERAL SPRINGS also HOT SPRINGS.

(7836) SQUALIDÆ, a family of Fishes of the section *Chondropterygii.* In this family, which includes the various species of Sharks, the branchiæ are attached by their outer margin to the skin, and the water taken in for respiration makes its escape through narrow outlets corresponding in number to that of the interspaces between the branchiæ : the number of these openings is usually five. So far the present fishes agree with the Ray or Skate family [RAIIDÆ] ; but the peculiar rhomboidal form of the body renders it easy to distinguish the Rays, which moreover have a peculiar cartilage arising from the nasal part of the skull, and extending towards and even meeting the anterior part of the crest of the pectoral. This character is pointed out by Muller and Henle, who state that it is found in all the Ray tribe, and also in *Rhinobatus* and *Pristis*, whereas there is no trace of it in any Shark.

In the Sharks the body is elongated, and tapering gradually from the head to the tail, or but little dilated in the middle. The muzzle is rounded or pointed, depressed, and projects over the mouth ; the nostrils are situated on the under side of the muzzle, in the form of oblique openings, which vary somewhat in figure, according to the species. The fins generally consist of two dorsals, two large pectorals, two ventrals, an anal fin, and a caudal, the form of which is peculiar. The portion of the tail of the Shark which supports the tail fin is almost always bent upwards at an obtuse angle with the body ; the fin itself may be divided into three parts—a superior, an apical, and an inferior portion ; that which runs along the upper surface is usually narrow ; that on the under surface is broader, but decreases in width to its point of junction with the apical portion, which is more or less dilated at the extremity and obliquely truncated. Such is the most common characte of the tail and tail-fin in the present fishes, an one which is not found in any recent fishes no belonging to the Chondropterygian group The Male Sharks are smaller, and differ externally from the Females in possessing two elongated appendages, one of which is attached to th hinder edge of each of the ventral fins, the use of which are not known. Some species of shark bring forth their young alive, whilst others ar inclosed in oblong simitransparent horny cases at each extremity of which are two long tendrils These cases are frequently found on the sea-shore and are called Sea-Purses, Mermaid's Purses &c. They are deposited, observes Mr. Yarrell by the parent shark near the shore in the winte months. The convoluted tendrils, hanging t sea-weed or other fixed bodies, prevent the case being washed away into deep water. Two elongated fissures, one at each end, allow the admission of sea-water ; and the young fish ultimately escapes by an opening at the end, near which the head is situated. For a short time th young shark continues to be nourished by th vitelline fluid contained in the capsule attached t its body by the connecting pedicle, till having acquired the power of taking food by the mouth, th remains of the ovum are taken up within th abdomen, as in birds and some other animals " A curious peculiarity has been observed in th young both of the Sharks and Skates during very early stage of their existence. From each of the branchial apertures branchial filament project externally ; each filament contains a singl minute reflected vessel, in which the blood i thus submitted to the action of the surroundin medium. The appendages are only temporary, and the blood of the fish is afterward aerated by the true gills. This very interesting discovery, which, I believe, is of recen date, forcibly reminding us of the tempora external branchiæ in the young Batrachia Reptiles in the tadpole state, has been observe by Mr. Richard Owen in the Blue Shark (*Carcharias glaucus*) ; by Mr. John Davy, in th Torpedo ; and by Dr. Allen Thompson, of Edinburgh, in the Thornback. Cuvier had previously noticed it, and, in ' Regne Animal,' has referred to a figure, published by Schneider, of a ver young shark in this condition, for which, regarding it as the normal state of the fish, that industrious pupil of Bloch had proposed the name c *Squalus ciliaris.*"—(Yarrell.)

The *Squalidæ* and *Raiidæ* have long occupied the attention of Professor Muller an Dr. Henle, who have conjointly published a excellent work on these groups, ' Systematisch Beschreibung der Plagiostomen.' The characte of the various genera into which they divide th Sharks are here given.

(7837) *Scyllium*, Cuv.—This genus is re ricted to such species as have the anal fin placed earer to the head than the second dorsal fin.

(7838) *Pristiurus*, Bonah., differs from *Scyl-* *ium* in having a long snout, and also in possess- ng a series of larger scales, arranged like the eeth of a saw on the upper edge of the tail. It contains but one species.—*Eng. Cyc.*

(7839) *Chiloscyllium.*

(7840) *Hemiscyllium*, Muller and Henle.

(7841) *Crossorhinus*, Muller and Henle.

(7842) *Ginglymostoma*, Muller and Henle.

(7843) *Stegostoma.* Muller and Henle.

(7844) *Carcharias*, Cuv.—Teeth flat, sharp, nd serrated on each side, either in the upper aw only, or in both jaws.—*Eng. Cyc.*

(7845) SQUILL, COUNTRY. ERYTHRO- IUM INDICUM. Rottl.

Unsool, Iskeel, ARAB.
Nurriala, CYNG.
Junglee-Peeaz, DUK. GUZ. HIND.
Nurri Vungayum, TAM.
Junglie piaz, DUK.

Feyaz-i-dushtie, PERS.
Nurri-Vunjyum, TAM.
Addi Vitella guddaloo, TEL.
Unsool, ARAB.
Kanda, HIND. and TEL.

This is not the produce of the Scilla maritima, hough it has, improperly, been so called by the English in India, from its resemblance to the rue Squill in medicinal virtues. Ainslie did not nd the Native medical Practitioners employ it. arriers are in the habit of using it, in conjunc- ion with other articles, for horses, in cases of trangury and Fever. It grows in abundance n these districts, in waste, sandy soils.—*Ains. Mat. Med. p.* 44.

(7846) SQUILL, SEA ONION.

Meerzwiebel, GER.
Scilla, Cipolla marina, IT.

Scille, FR.
Scilla, LAT.
Cebola albarrana, SP.

A perennial bulbous rooted plant (*Scilla aritima*), found on the shores of Spain, Portu- al, North of Africa, and the Levant. The ulbs are pear-shaped, and vary in size from that f the fist, to the compass of a child's head. he root is very nauseous, intensely bitter, rimonious, and causing inflammation when rub- ed in the skin. As met with in the shops, quill is commonly in the form of the dried reds of the root. It is one of the most useful emedies in the materia medica.—*Faulkner.*

(7847) STACHYS. LABIATÆ. These are lants of no great beauty, and being of a weedy ature are hardly worth cultivating.—*Riddell.*

(7848) STACHYTARPHETA MUTABILIS. ERBENACEÆ. A shrubby plant with variegated arlet flowers in terminal spikes; propagated y cuttings.—*Riddell.*

(7849) STACHYTARPHETA JAMAI- ENSIS. An annual, with blue flowers in ter- inal spikes; common.—*Riddell.*

(7850) STAGMARIA, a genus of Plants be- nging to the natural order *Terebinthaceæ.* It as named by Mr. W. Jack, assistant-surgeon in e East India Company's service, and author of 'Malayan Miscellanies,' from the Greek word στάγμα, 'a dropping fluid.' The tree *S. verniciflua*, which is the *Arbor vernicis* of Rumphius, and the Kayo Rangas of the Malays, is full of acrid resinous juice, and is a native of the Eastern Islands, but not very abundant in Sumatra, though occasionally found in the neighbourhood of rivers. The calyx is tubular, with the limb irregularly ruptured, deciduous. Petals 5, longer than the calyx, obtuse spreading, subreflexed. Stamens 5 alternating with, but inserted above, the petals into the stipelike torus. Filaments filiform, equal to the petals in length. Anthers oblong. Ovary stipitate, 3-lobed, lobes 1-seeded, 1-2 of which are usually abortive. Styles 1-3, terminating the lobes of the ovary. Stigmas obtuse. Berry kidney-shaped, furrowed, 1-seeded, with a warty rind. Embryo exalbuminous, erect: cotyledons united; radicle incurved. The genus is nearly allied to *Rhus*, but besides the difference indicated in the above character, it has simple leaves, which are without stipules. The wood of the tree is of a fine dark colour towards the centre. The bark exudes a resin which is extremely acrid, causing excoriation and blisters when applied to the skin, in this, as well as in becoming black when exposed to the air, it resembles the *Melanorrhœa*, Cashew-Nut Tree, Poison-Oak, and many others of the *Terebinthaceæ.* According to Rumphius, this tree yields the celebrated Japan lacquer, or varnish, and he considers it the same with that of Siam and Tonquin. Loureiro however represents the latter to be the produce of an *Angeia.* Mr. Jack says the varnish of Siam and Cochin-China is probably the best, but that of Celebes and of Java, which is the produce of this tree, is also employed for the same purposes, and cannot be much inferior, as it bears an equally high price. Rumphius says the exhalations of this tree are considered noxious, and the people of Macassar, and of other parts of Celebes in particular, entertain such dread of it, that they dare not remain long under it, much less repose under its shade. As however it furnishes the celebrated varnish, the Chinese and Tonkinese boldly repair to the tree, but employ caution in collecting the resin. This they do by inserting into the trunks two pieces of bamboo, sharpened at their points, in such a manner as to penetrate the bark in a somewhat oblique direction. These remain all night, and are extracted before sunrise the next morning, the trees yielding no juice during the day. This fluid resin bears a high price, being sold in Tonkin and Camboja for 33, 50, or 60 dollars, the pecul, of about 133 lbs., but in many of the provinces of China for 200 or 300 dollars. The varnish is prepared for use by boiling it with an equal weight of the oil of Tang-yhu, which is a Chinese tree allied to the *Mimusops elengi*, from whose fruit an oil is prepared. The proportions are varied according to the purposes for which the varnish is required. Sometimes dry pigments are added for the sake of red or other colours. The Japanese are the most skilful in preparing and ornamenting all kinds of work with this varnish, and their black lacquered works are conveyed to all parts of the world. (Jack, *Malayan Miscellany*, No. 3 reprinted by Sir W. Hooker.—*Eng. Cyc.*

(7851) STAGMARIA VERNICIFLUA, one of the black varnish trees of China.—*O'Sh.*

(7852) STALACTITE AND STALAGMITE. Stalactitic Carbonate of Lime occurs chiefly in long masses suspended from the roofs of caverns in limestone rocks. Stalactites appear to be continually forming; water containing carbonate of lime held in solution by carbonic acid, trickling through crevices in the roofs of the caverns, gradually during its exposure to the air loses its carbonic acid, and consequently deposits its carbonate of lime; the water passing over the portion first deposited gradually adds to it, and eventually gives the carbonate of lime its great length and stalactitic character. The flatter deposits, called stalagmites, are formed on the floor of the cavern by the water there depositing that portion of its carbonate of lime which is not separated during the formation of the stalactite. Stalactic Carbonate of Lime is met with in the veins of lead-ore in Durham and Northumberland. Caverns are sometimes nearly filled with these deposits, which in some cases are of very large dimensions. The most remarkable instances of their occurrence in Britain are in the cavern at Castleton in Derbyshire, and Macallaster Cave in the Isle of Skye. The grotto of Antiparos in the Archipelago, the Woodman's Cave in the Harz in Germany, and that of Auxcelle in France, are striking instances of their formation in other countries. Besides the occurrence of this variety of carbonate of lime in the stalactitic form, it is sometimes met with reniform and tabular, and in other imitative shapes. The facture is sometimes perfectly lamellar, occasionally fibrous, the fibres diverging from a centre, with pearly or silky lustre, and sometimes resinous or waxy. The colour varies from white to grayish, brown, red, and yellowish-white. Opaque, but frequently translucent. The Oriental Alabaster, much employed by the ancients in statuary and the formation of vases, appears to be of stalactitic origin.—*Eng. Cyc.* *Carbonate of Lime*, is a very abundant mineral in the Tenasserim Provinces and embraces several varieties. Stalactical Carbonate of Lime is one of these. All the Tenasserim limestone caves have stalactites hanging from their roofs; and stalagmites raised on their floors. The Siamese Karens often bring over bits of limestone of the shape of a shell, and when broken, a shell usually of the genus melania appears, that has been encrusted with carbonate of lime. Much of the alabaster of which ornaments are made is stalagmite; but all the alabaster images of the Tenasserim coast are made of marble: and not of compact gypsum, which they much resemble.—*Mason.*

(7853) STALAGMITES (from σταλαγμός, a dropping), the name of a genus of Plants belonging to the natural order *Clusiaceæ*, or *Gutliferæ*. It has polygamous or bisexual flowers; 4-5 sepals, which are persistent and bractless; 5 petals alternating with the sepals; 4-5 united stamens, the bundles flat, elongated, and divided at the apex into several short antheriferous portions opposite to the petals, and alternating with 5 large truncated glands; the anthers are 2-celled, bursting longitudinally; the ovary is 3-5-celled, with 1 ovule in each cell; stigma 3-5-lobed; the fruit a berry. The species are trees natives of the East Indies and Ceylon, and belong to the family which produces the gamboge of commerce. Dr. White states that one of the species, the *S. ovifolia*, which is a native of Ceylon, yields a true gamboge, which is employed in commerce. It is known by its oval shining leaves, its lateral fascicled flowers, male and hermaphrodite mixed. Its anthers are arranged in 6 or 8 bundles, and it possesses a 3-celled 1-3-seeded ovary.—*Eng. Cyc.*

(7854) STALAGMITES OVALIFOLIA, BROWN AND GRAHAM. *Syn.* Xanthochymus ovalifolius. (Roxb. ii. p. 632.) A native of the Southern provinces of India and Ceylon. The seeds were sent from Ceylon by General Hay MacDowal, to the Calcutta Garden, under the Cingalese name *Ambul Ghorka*; in 7 to 10 years the trees began to blossom during the whole of the hot season, and in July 1812, when ten years old, they produced perfectly ripe fruit. Dr. Wight is of opinion that this tree yields one kind of gamboge in Ceylon. It is desirable to ascertain what may be the produce of the trees in the Calcutta Garden.—*O'Shaughnessy, page* 236.

(7855) STALAGMITES PICTORIA, *Syn.* XANTHOCHYMUUS PICTORIUS. (Roxb. ii. p. 633.)

Dampel, BENG. and HIND. | Kata Ghorka, CING.

A native of the mountainous districts of India; leaves opposite, linear, lanceolate; flowers in lateral fascicles, berry ovate, pointed. Fruit ripens in November and December, and the tree yields a large quantity of inferior gamboge.—*O'Shaughnessy, page* 236.

(7856) STAPELIA, ASCLEPIADEÆ.—This is an extensive genus of plants with curiously marked flowers like a toad's back, they are star-shaped, and grow from the roots; these plants being succulent, are apt to drop off if grown in too rich or moist a soil, they give seed and may be cultivated from it, but more readily from slips shaded partially, and watered sparingly.—*Riddell.*

(7857) STAPELIA BUFFONIA. Asclepiadeæ.

Kar alum. Duk.

The Toad-like Stapelia.

(7858) STAPELIA GRANDIFLORA and S. VARIEGATA.—The species are stemless plants with fœtid flowers, star-shaped, colour resembling a toad's back: the plants should not have much water or be exposed to the sun; easily propagated by seed or cuttings.—*Riddell.*

(7859) STAPELIA VIRGATA. Rottl.

Callymolian, Tam | Koondana Komooloo Tel

Ainslie's Mat. Med. p. 259.

(7860) STAPHYLEA (from σταφυλή, a bunch of grapes), the name of a genus of Plants, the type of the natural order *Stapheleaceæ*. It has a coloured 5-parted calyx, with an urceolate disc at the base; five upright petals; five stamens standing round the disc; an ovary with from two to three styles, with a small stigma; a membranaceous swelled capsule with two or three cells, and one or two seeds in each. This genus has six species, of which one is a native of Europe, one of North America, one of Japan, two of Jamaica, one of Peru, and one of the Himalayas.—*Eng. Cyc.*

(7861) STAPHYLEA EMODI is an Indian species: it was found by Dr. Royle in the Himalayas, at an elevation of 7000 feet. (Royle, 'Ill. Him. Bot.,' p. 165.)

(7862) STAPHYLEACEÆ, *Bladder-Nuts*, a small natural order of Plants belonging to the Syncarpous group of Polypetalous Exogens. They are shrubs with opposite pinnate leaves, having, both common and partial petioles, and the flowers arranged in terminal stalked racemes. The calyx has five sepals, which are imbricated in æstivation; petals five; stamens five, alternate with the petals, perigynous; ovary 2- or 3-celled, seated on a disc; fruit membranous or fleshy, frequently deformed by the abortion of some of its parts; exalbuminous roundish ascending seeds, with a bony testa, large hilum, and thick cotyledons. There are only three genera and ten species belonging to this order, which are inhabitants of the warmer and temperate parts of the earth. Only one species, the *Staphylea pinnata*, is found in Europe. This order was separated by Lindley from the order *Celastraceæ*, with which it is most nearly allied, but from which it is distinguished by its opposite pinnated stipulate leaves. One of the genera, Turpinia has unisexual flowers. The species do not possess active properties. The seeds of all contain a mild oil, which may be expressed.—*English Cyclopedia, page* 892.

(7863) STARCH.

Abgoon, Arab.
Amidon, Fr.
Amidam, Ger.
Amoti, It.
Neeshashta, Pers.
Kruchmal, Rus.
Amidon, Almidon, Sp.

Procured generally from wheat flour and potatoes. The best kind is white, soft, friable, and easily reduced to powder. It is insoluble in cold water and alcohol, but readily affords a gelatinous solution in warm water, which is largely employed for stiffening articles of wearing apparel, and for dressing some descriptions of goods after weaving. It is also much employed by calico printers, and others.—*Faulkner.* Starch is a substance which is found very generally present in the vegetable kingdom. It occurs in the forms of irregularly shaped granules inclosed in the cells of plants. It is easily detected in the cells of plants under the microscope, by the addition of a small quantity of solution of iodine which immediately gives to the starch granules a blue colour. Starch can be readily separated from the tissues of plants, on a large scale by bruising them and stirring them in water; when left at rest the cellulose of the tissue falls to the bottom of the vessel, and the starch floats in the water. If the water containing the starch is now poured off and allowed to stand a few hours the starch will fall to the bottom of the vessel, and is easily collected. In this way it is obtained for commercial and dietetical purposes. Starch is thus found to be diffusible through water, but not soluble in it. It differs then from cellulose, on the one hand, by its diffusibility through water; and on the other, from dextrine, sugar, and gum, by its insolubility. In composition it resembles these substances, and during the growth of the plant it is evidently converted into one or the other according to the necessities of the plant. It contains carbon, hydrogen, and oxygen (C_{12}, H_8, O_3,) and belongs to that series of substances to which the term Dextrine has been applied. In certain groups of plants, intermediate substances between those mentioned have been obtained. Thus, in the Lichens, a substance exists which resembles starch in many of its properties, but does not assume its definite granular form. This is called Lichein. Another substance also closely approaching starch in its general characters is Inulin. This substance is not coloured blue by iodine, and has other distinctive properties. It is rounded in the various species of *Inula*, and has also been detected in other plants. From these facts we may gather that Starch is the result of the chemical activity of the plant-cell at particular stages of its growth. It is one of those secretions to which the name assimilable is applied, and is evidently capable of undergoing great changes during the life of the plant. It is almost constantly present during the earlier stages of cell-growth, so much so as to lead to the supposition that its presence is universal during certain stages of the life of the plant-cell. In some plants and parts of plants however it rapidly disappears, being either converted into sugar or cellulose, or some of the numerous unassimilable secretions of plants. That the latter takes place very frequently is rendered probable by the discovery that caoutchouc and gutta percha can be artificially manufactured from starch, whilst it has long been well known that starch may be converted into sugar and gum. Starch differs from sugar in its not being fermentable. It is however readily convertible into sugar by agents which induce fermentation. It has been supposed that the protein of the plant-cell acts chemically in converting starch into sugar during germination, and the term Diastase has been applied to the proteinaceous matters found in connection with the starch of germinating seeds. Starch occurs usually in the cells of plants in the form of granules. In the earlier stages of their growth these are attached to the sides of the cell, or to portions of the endoplastic protein wherever they may be placed. In most cases these granules are simple or single; but when they are developed near each other a union is formed of one or more, and the result is a compound granule. Schleiden also describes Amorphous Starch, and states that in some plants the sides of the cells are lined with a layer of starch having no definitely-formed granules. In the majority of starch-granules a little spot may be seen which is called the hilum, and has been by some regarded as a nucleus or central point of the formation of the granule. It does not however seem to bear the relation in all cases. Much difference of opinion exists as to the true nature of the starch granule. Some observers have supposed that it consists of a series of flattened plates or dishes laid one upon the other, the result of successive depositions of starch matter. This view will be seen to be erroneous if the starch-granule is submitted to heat, or sulphuric acid, when it will be found to unfold and exhibit itself in the form of a vesicle or bag. From this it appears that this bag is compressed in the ordinary state of the starch, and its sides being folded in, gives it the appearance of dishes. At one time it was supposed that starch was characteristic of the vegetable kingdom. Veichow has however demonstrated its existence in connection with cellulose in a large number of animals. Bush first pointed it out in the human brain. It has been found also in the human blood; and with cellulose and sugar it can no longer be regarded as truly characteristic of the vegetable kingdom.

Starch is a substance easily manufactured, and is largely used in several of the arts, as well as an article of diet. It can be obtained from a great variety of plants, and many of the most productive of it are natives of the tropical countries in the East. Starch occurs in the forms of irregularly shaped granules enclosed in the cells of plants, and can be easily separated from the tissues of plants, on a large scale by bruising them, and stirring them in water; when left at rest the cellulose of the tissue falls to the bottom of the vessel, and the starch floats in the water. During certain stages of the life of the plant-cell, the presence of starch is supposed to be universal, but in some plants or parts of plants it rapidly disappears, being either converted into sugar or cellulose, or some other secretion. Indeed no two writers agree as to the per centage of starch yielded by different plants, nor is this result unexpected, for even in the same plants, the quantity of starch varies with the season, the soil, climate, age, ripeness, length of time the roots have been out of the ground, &c. It will be seen however that starch is one of the constituent parts in all mealy farinaceous seeds, fruits, roots, and other parts of plants. In the West Indies, the Maranta arundinacea, allouyea, and nobilis and various species of Canna furnish this fecula, Two varieties of Cassava furnish a very superior quality, which is known in commerce as Brazilian arrow root, the amylaceous matter from Zamia pumila and other species at the Cape of Good Hope has been sent as arrow root, a similar product is obtained in Chili, from Alstromeria pallida and the Singalese get a kind of starch from the nut of the Cycas circinalis by pounding, the fresh kernels. The following are the chief fecula or starch-like substances of the East and may be consulted separately also under the head ARROW ROOT, FOOD AND MARANTEA.

Arrow root, West Indian,	...	Maranta arundinacea.
Arrow Root, East Indian	... ...	Maranta ramossissima. Curcuma angustifolia.
Do. do.	...	from other species of Curcuma.
Do. do.		
Do. Mergui,	...	Tacca pinnatifida.
Tapioca,	...	Jatropha manihot.
Cassava-meal.	...	Do.
Plantain meal.	...	Musa paradisiaca.
Sago, Singapoor,	...	Arenga saccharifera.
Sago, Malabar,	...	Caryota urens.
Sago-meal,	...	Phœnix farinifera.
Salep,	...	Habenaria, &c.
Nelumbium seeds,	...	Nelumbium speciosum.
Singhara seeds,	...	Trapa bispinosa
Yams,	...	Dioscorea, (var. sp.)
Telinga potato,	...	Amorphophallus campanulatus,
Sweet potato,	...	Batatas esculenta.
Ceylon moss,	...	Plocaria candida.
" Kotee kalangoo."	...	Aponogeton Monostachyon.
Farina of	...	Parkia Biglobosa.
Chara kelangoo,	...	Plectranthus tuberosus.
Champoo,	...	Caladium Nymphifolium.
Sago, Indian,	...	Cycas revoluta.
,,	...	Cycas Circinalis.

The specific quantity of starch derived from several plants varies from 1·41 to 1·47. and probably those specimens prepared from dry seeds, such as wheat and maize starch, which, as commercial articles at least, are less pure than those prepared from recently dug roots, have also the lowest density. As an article of diet, the most tenacious varieties of starches are preferred, on account of the economy of employing an article of which a less quantity will suffice, and the same is true when applied to starching linen, provided the Jelly be not deficient in clearness. In respect to tenacity, there is a very great difference between the Jellies prepared from the different starches, a disc of jelly prepared from sweet Cassava breaking with 78 grains, while that of a jelly from the *Tous les mois*, of the West Indies did not break with a weight of 2,446 grains. Experiments of a similar kind are required to test the starches of India. When Starch jelly is used for the purpose of starching or glazing linen, or cotton goods, the most transparent varieties are preferred,provided they also possess the requisite tenacity, but on this point, also experiments regarding our Indian Starches are necessary.—*Madras Exhibition of* 1857. *English Cyclopædia. Simmonds' Commercial Products.* Starches from different plants are best distinguished from one another by examining either as transparent opaque objects their grains or globules with a microscope, for though in the same species, there are considerable differences in size and form,the different kinds are on the whole quite distinguishable. This is of the more importance because the adulteration of starches is chiefly effected by mixing a cheap variety with a higher priced one, and in practice when the observer has a number of pure and authentic specimens before him to have recourse to as standards of comparison the discrimination is by no means difficult.—*Hassall.*

(7864) STATICE. PLUMBAGINEÆ. Sea lavender.—Many of these species bear pretty purple, white and blue flower, and are much cultivated in Britain ; the S. Arborea is a very handsome shrub and requires a large space for its spreading roots, is propagated by seed, in good garden soil.—*Riddell.*

(7865) STAUNTONIA, a genus of Plants belonging to the natural order *Menispermaceæ* and tribe *Lardizabaleæ*, named after Sir George Staunton. This genus is remarkable as being one of those which is common to China and the Himalayan Mountains, and has hence afforded useful inferences respecting the districts where the tea-plant might be successfully cultivated. The genus is characterised by having monœcious flowers; the male having a 6-leaved calyx, with the leaflets in two rows; petals 6 or wanting; stamens 6, opposite to the petals, distinct or monadelphous; anthers adnate, opening outwards; rudiment of ovary. The female flower has the calyx of the male ; no petals ; 6 sterile dwarfish stamens ; ovaries 3, distinct, oblong, with many ovules ; stigmas sessile, simple-flowered. Berries often fewer than 3, divaricate, fleshy, opening longitudinally on their inner side. Seeds numerous, oblong-ovate, or reniform ; embryo minute in base of a fleshy albumen ; radicle inferior. The species are divided into two subgenera—*Stauntonia* being without petals and having monadelphous stamens : *Holbaellia* having 6 gland-like petals and the stamens free. The species form large climbing shrubs, with alternate petiolate peltately digitate leaves. Leaflets leathery in texture, 3-nerved, very entire, with all the petioles swelled and jointed at both extremities ; racemes fascicled, axillary, a few flowered at the base of the branches. Flowers white, externally purple, fragrant. Berries large and purple. The Himalayan species are found in Nepal and in 30° N. lat., at elevations of 5000 and 6000 feet. Their fruit, having a sweetish pulp, is eaten by the natives of these mountains, and they might no doubt be acclimated in the gardens of this country, as they experience a considerable degree of cold at the elevations where they are found.—*Eng. Cyc.*

(7866) STEARIN. The harder portion of animal fats ; *olein* or *elain* being the softer one. Stearin yields an acid, called *Stearic acid,* having the form of brilliant, white, scaly, crystals, which is largely employed in soap and candle making. (*Waterston.*)—*Faulkner*

(7867) STEATITE, a soft magnesian mineral *silicate af magnesia*—unctuous to the touch, for which reason it is also termed *soapstone*. It is also known in Commerce as *French chalk*. Its sp. gr. is 2.65 to 2.9 ; its colour is usually greyish,but, when worked and varnished, it becomes dark olive green. It occurs in beds generally associated with talcose slate. Like *potstone* and *serpentine,* which it nearly resembles in composition, it becomes considerably harder by exposure to the air. When first raised it may be easily turned with chisels : the turned articles may be polished first with sand and water, and afterwards with tripoli and water, and, for the highest gloss, with rotten stone and oil, woollen cloths being used in each case. When the steatite has become hard, the methods employed for alabaster, may be resorted to. Steatite has also been named *figure stone* in consequence of its having been used as the material for idols and other figures, which form the household gods of the Chinese : it was formerly supposed that they were made of a preparation of rice. The refractory nature of soapstone, and the facility with which it is worked, admit of its being cut into slabs for fire stones in furnaces and stoves, and for jambs for fire-places. It is also mixed with blacklead in the manufacture of crucibles. It is bored out for conveying water instead of lead pipes. It is an excellent material for kitchen-sinks, wash-tubs, bath-tubs, urinals, &c. It is readily wrought, and may be bored, turned, and planed by the ordinary tools of the carpenter, and it may be screwed together almost as easily as hard wood. It is used in the manufacture of porcelain : it makes the biscuit semi-transparent, but brittle. It forms a polishing material for serpentine, alabaster, and glass, and removes grease spots from cloth. It is ground into a powder and used for diminishing the friction of machinery. Dana states that soapstone is used in the United States for the sizing-rollers in cotton factories ; in which case they are of large dimensions, such as 4½ feet long, and 5 to 6 inches in diameter. The advantage of soapstone as a material for baths and sizing rollers, are, that it is not affected by the acid usually employed in sizing, and is not liable to warp, contract, or expand, by change of temperature and moisture.—*Tomlinson.* *Steatites* are common in Southern Asia, and of all sorts and colors. At Kurnool and at Salem and near Mysore there are very fine and beautifully white soapstones, and near Chittoor there is a valuable description, (similar to the Cornish serpentine) procurable in large blocks and suitable for many statuary and decorative purposes. There is a quarry of excellent potstone at the Nagery Hills, which is likely to become a valuable addition to the Madras trade. The stone is of fine grain, easily worked with the chisel and susceptible of a high polish, when oiled, this stone resembles in a great degree black marble. Some interesting specimens of manufacture in this material, show a considerable advancement in design and execution.—*M. E. J. R.* See SOAPSTONE.

(7868) STEEL.

Acier, FR.
Stahl, GER.
Foulad, GUZ. HIND. PERS.
Acciajo, IT.
Chalybs, LAT.
Stal, RUS.
Acero, SP.
Stal. SW.

Is iron combined with a small quantity of carbon. It is brittle, resists the file, cuts glass, affords sparks when struck on flint, and retains the magnetic virtue for any length of time. It loses this hardness by being ignited, and cooled very slowly. Steel is used for making razors, surgeon's instruments, swords, forks, &c.—*Faulkner.*

Conasamoondrum Steel, is made at several villages in the Circar of Elgundel at Ibrahimputnum, and Konapore in the Karaolla Purgunnah, and at Atmacore and Chintulpet in the Velloorla Talooka, it formerly was prepared at several other places, but the Steel furnaces in them are now abandoned. The teepoor as it is called, the raw material of the steel, is manufactured at Maytpilly a village twelve miles south of the Godavery, belonging to Balmookund, from a ferruginous sand procured from gneiss by roasting, pounding and washing. The whole process of the manufacture of this steel is detailed with accuracy and minuteness by Dr. Voysey in the first volume of the Asiatic Society's Transactions and also by Dr. Malcolmson in the Geological Society's Transactions of 1839. Both these gentlemem visited the steel furnaces at Konasamoondrum in the adjoining district of Neermul which supply the material from which the Damascus blades are manufactured. The steel manufactured at these villages is very inferior to the Konasamoondrum steel—and does not fetch half its price Yet the teepoor is used for both, and the same care is apparently bestowed in the preparation, the only difference that could be detected was that the pure iron which along with the teepoor and the bran is placed in the crucible, is in the case of the Konasamoondrum steel prepared from the yellow clay iron ore, found in the laterite at Taatpilly, while at Ibrahimputnum and the other villages any iron without reference to the ore from which it is smelted is used. The exact chemical condition of the metal under the form of steel has as yet evaded scientific investigation which renders it probable that the inferiority of the Ibrahimputnum steel may be attributable to this one neglect. The Mogul who rents the Konasamoondrum furnaces would seem to be of this opinion as he holds a strict monopoly over the Taatpilly iron, insomuch that I had some difficulty in procuring a specimen of the metal. In the steel furnaces, five men are employed, viz ; the principal workman who has the care of the crucibles, which he is continually moving about the furnaces by means of a long iron rake, and four bellows men. The daily pay of the chief is two seers of rice, and two annas a day. The others receive half the rice and money, if the steel comes out of the crucible at all blistered or unequal on the surface, it is rejected as worthless.—There are two kinds of crucibles, the large and the small, each of which contains a lump of steel of from one to two pounds in weight. The cost of the furnace varies from four to six annas for the smaller pieces, and from eight to ten annas for the larger. The workmen complain that the Hyderabad market is now lost to them, their steel being undersold by steel from Europe, which is there preferred for the manufacture of arms. The chief consumption is confined to the country about, where it is used for hatchets, sickles, &c. At Lingampilly and another village, both close to Aimulwarrah, barrels for Pistols and Matchlocks are prepared. All kinds of old iron, old moat buckets, agricultural instruments, &c. are collected and formed into rods of the thickness of a man's finger.—These are then twisted by an instrument for the purpose ; three or four of these rods are joined together lengthways, another hand of iron of the same breadth and of the thickness of a third of an inch is taken and welded to this, both being formed into a band which is twisted and afterwards beaten into a solid cylinder which is bored by a hard steel chisel. Pistol barrels are made after this manner, but less trouble is bestowed in the manufacture of a coarser kind of Matchlocks—the process commencing with simply twisting a band of metal. Pistol barrels manufactured by the first process are sold for Rupees twenty and upwards, and Matchlock barrels so prepared for double that amount, the last made after the simpler manner are much cheaper. Swords, daggers, bullum and spear heads are manufactured at Elgundel from the country steel —Cutii. Davidson, Assistant Resident.—*M.C.C. for Ex. of* 1851. The manufacture of steel is a branch of Industry for which India has long been celebrated. This substance can be made of good quality in small quantities and at a comparatively trifling cost; the process is more carefully conducted than that of making iron and the results are on the whole more satisfactory. Some defects however are found in the cast steel of India, which interfere materially with its sale in the European market. These are the hardness of the external surface of the melted lumps, and their inequaity, few being alike. The hardness is caused by the lumps cooling too rapidly on the surface from the small size and thinness of the crucibles. This branch of manufacture is usceptible of improvement in India, and there s a great abundance of rich ores, fluxes, and refractory clay in most of the districts of this Presidency. The great desideratum, however, is a bed of good coal that would convert into coke Some of the black sandstones and band irons xhibited in this class with their accompanying trata of lime, fire-clay, white pipe-clay and thick beds of yellow and red sandstone, are very similar o those found in the coal bearing strata of Bengal and other countries.

The steel wire of Chinnapatam in Mysore, has long been known: a specimen exhibited by the uperintendent, Bangalore Division, is worthy of Honorable Mention.—*M.E.J.R.*

(7869) STENACTIS. Compositæ.—This is showy purple flower, and well adapted for orders; it is a native of California and propaated by cuttings or dividing the roots.—*Riddell.*

(7870) STERCULIA, a genus of Plants which gives its name to the natural order *Sterculiaceæ*, which sometimes forms a section of the rder *Byttneriaceæ*. The name is derived from sterculus,' as that from 'stercus,' some of the pecies being remarkable for the strong and disgreeable odour of their leaves or flowers. The enus is characterised by having polygamous or onœcious flowers; calyx 5-lobed, somewhat coaceous; petals wanting; stamens monadelphus, disposed in a short sessile or stipitate urceols; anthers adnate, ten, fifteen, twenty, in one r two rows; solitary or ternately aggregate; ary stipitate or sessile; carpels, follicular, five, r fewer from abortion, distinct, 1-celled, one or any-seeded, opening on the inner side: seeds sposed in two rows along the suture of the rpels; sometimes, when the carpels have opened nd become spread out, they appear to be arnged along the sides of a leaf-like membrane; eds with fleshy albumen, and flat leafy, equal tyledons. The species consist of various-sized ees, with soft timber, which are found in the trocal parts of the world with simple or compound ives and axillary panicles or racemes of flowers Many of them are of considerable use in the countries where they are indigenous. Like the order to which they belong, several species are mucilaginous; and others yield fibre, which, from its tenacity, is made into ropes. Some yield a gummy exudation resembling tragacanth, and which is sometimes substituted for it: thus the gum called Tragacanth, which is sometimes imported from Sierra Leone, is said by Dr. Lindley to be yielded by a species which he called *S. Tragacantha*, the *S. pubescens* of others. So Dr. Roxburgh states Kuteera Gum, which is often substituted for tragacanth, to be produced by *S. urens*, a tree of the mountains of the Coromandel coast. Dr. Royle however states that the kuteera gum of many parts of India is yielded by *Cochlospermum Gossypium*.—*Eng. Cyc.*

It is however certain that a species of Sterculia yields a tragacanth-like gum on the west coast of America, as another does in India. Several species of this genus are remarkable for the tenacity of the fibre of their bark, which is employed for cordage, as *Myrodia longiflora* in Guiana, and *Chorisia crispifolia* in Brazil, *Dombeya umbellata* in the Isle of Bourbon, and *Sterculia Ivria* in the West Indies *Helicteres Isora* may be similarly employed in India. *Sterculia guttata* is a tree, a native of Malabar, which was first made known by Capt. Dickenson, in the year 1802. The bark of the younger parts of the tree abounds with very strong, white, flaxen fibres, of which the inhabitants of Wynaad manufacture a kind of coarse cloth. It is not usual to make use of the bark until the tenth year, when its size will be equal to that of most forest trees. The tree is felled, the branches lopped off, and the trunk cut into pieces of six feet long, a perpendicular incision made in each piece, the bark opened, and taken off whole, chopped, washed, and dried in the sun. By these means, and without any further process, it is fit for the purposes of clothing.

Sterculia villosa, called *Oadal* in Assam, is another tree of this genus, which is a native of the mountainous countries to the eastward of Bengal. Trunk straight. The bark is smooth, but fibrous. Bags are made of it. Its fibres are made into cords by the natives of the eastern frontier of Bengal, to bind wild elephants with. Of a coil of *Oadal* rope, Major Jenkins gave the following notice in the year 1847; The *Oadal* tree is very common, and the rope is made most readily; the bark, or rather all the layers, can be stripped off from the bottom to the top of the tree with the greatest facility, and fine pliable ropes may be made from the inner layers of bark, whilst the outer yield coarse ropes. The rope is very strong and very lasting—wet doing it little injury."

Oadhal is a creeper in Kemaon, with fine, strong fibres; and *Microlæna spectabilis* is a tree found at the foot of the Himalayas, which yields fibres fit for rope-making. —*Royle Fib. Plants.*

The seeds of *S. macrocarpa* and of *S. heterophylla* are called Cola on the African coasts. In Asia, in the same way, the seeds of *S. Balanghas*, are described by Rumphius as being roasted and eaten by the natives of Amboyna, while the capsules are burned for the preparation of the colouring matter called Cassoumba. The seeds of *S. urens* and of *S. fœtida* are likewise eaten in India after having been roasted, as are those of *S. chicha* in Brazil. Those of *S. alata* are also said to be used as a cheap substitute for opium in the district of Silhet; but this statement, implying the presence of narcotic principles, requires careful examination before it can be received as a fact, as we generally find an accordance rather than so great a difference in the properties of species of the same genus.—*Eng. Cyc.*

(7871) STERCULIA: *Species.* Nar or bast from a species of the tree common in Wynaad on the higher elevations. The bast is as durable as ordinary Russian bast, but inferior to the best Russian bast.—*McIvor.*

(7872) STERCULIA ALATA. BOODH'S COCOANUT. A handsome tree bearing a large fruit, called Boodh's cocoanut is met with in the Tenasserim Provinces, whose winged seeds are sometimes eaten by the natives.—*Mason.*

(7873) STERCULIA COLORATA.

Bhaee or karaka, DUK.

A large tree with palmated five-lobed leaves; deciduous in the cold season; flowers in March and April; carpels of a bright red, somewhat resembling the broad pod of a pea opened with the peas adhering; the tree when covered with them has a strange appearance. —*Riddell.*

(7874) STERCULIA FŒTIDA, Linn. FETID STERCULIA.

Peenata marum, TAM.	Clompan Boerong, RUMPH.
Karill, MAL.	
Peenary Marum, TAM.	Gurrapa Badum Chettoo, TEL.

Grows to a very large size, with digitate leaves; deciduous in the cold weather. Flowers in March and April, of a dull crimson colour, and of an offensive odour: the seeds are roasted and eaten.—*Riddell.*

A large tree but chiefly found on the W. Coast and Mysore, where it is applied to a number of useful purposes. This is one of the trees which are believed to furnish the smaller "Poon spars," Hort. Garden 19.—*M. E. J. R.* In the cells of this fruit there are contained certain white kernels which have a very pleasant taste inter carnem ossiculum locatur oblongo-rotundum nucleum continens candidum amaro-dulcem. "Vide *Hort. Mal. Phar.* 4, *page* 75. The flower has a most offensive smell and hence the Tamool name. —*Ainslie, p.* 230. The *Sterculia fœtida*, distinguished by the abominable fœculent smell of its flowers, is common on the continent of India and Java, where the fruit is used in the treatment of gonorrhœa. The leaves are deemed aperient, and a decoction of the fruit mucilaginous and astringent. The seeds are oleaginous, but are deemed unwholesome. The fœtid sterculia is not uncommon in the forests, and its seeds are eaten like filberts.—*Mason.*

The oil.

Goodira pusjun yennai, TAM.

The semi-solid oil obtained by expression from the seeds of this large jungle tree, appears to contain a large per centage of stearine, but it is doubtful if it can be obtained in large quantities: it was sent to the Great Exhibition of 1851 from Bombay.—*M. E. J. R.*

(7875) STERCULIA FOLIIS DIGITATIS.

Malay Taynga, TAM.	Conda Thankaia, TEL.
Hill Cocoanut, ENG.	

The edible seeds of this plant are eaten by the poor and are contained in follicles, each of which is nearly as large as two hands joined.—*Ainslie, page* 227.

(7876) STERCULIA GUTTATA.

Goldar, DUK.	Pee marum, TAM.

A large erect tree; leaves long petioled, villous underneath; flowers in simple terminal racemes, pubescent on both sides, outer and inner of a pale yellow colour, marked with purple spots; deciduous. Carpels the size of a large apple, three or more growing together, of a reddish colour; seeds size of a chesnut, roasted and eaten by the natives.—*Riddell.* *Sterculia guttata* is a native of Malabar, and was first made known by Capt. Dickenson, in the year 1802. The bark of the younger parts of the tree abounds with very strong, white, flaxen fibres, of which the inhabitants of Wynaad manufacture a kind of coarse cloth. It is not usual to make use of the bark until the tenth year, when its size will be equal to that of most forest trees. The tree is felled, the branches lopped off, and the trunk cu into pieces, of six feet long, a perpendicular incision made in each piece, the bark opened, and taken off whole, chopped, washed, and dried in the sun, by these means, and without any further process, it is fit for the purposes of clothing.—*Royle.* This, says Wight, is a large tree; but I am not acquainted with the timber, no specimen having been sent with the leaves.—*Wight.* From Wynaad, Captain Dickenson sent the seeds to the Botanic garden in 1802, and the young tree reared therefrom blossomed for the first time in December 1809. They were then about twenty feet high, and the trunk twenty-one inches in circumference four feet above the ground. The bark of this tree, the Malabars convert into a flaxy substance of which the natives of the lower coast of Wynaad contrive to make a sort of clothing which derives its name from the first process of its manufacture, viz, the chopping the bark into small pieces, from anragoonoo, to cut. It is not customary to manufacture the bark until the tenth year, when its size will be equal to that of most forest trees.—*Rhode M. S. S.*

(7877) STELLARIA MEDIA.

Kaaray Muntha keeray Tam.

Chickweed. This English weed is used by the natives on the Neilgherries as a pot herb, eaten alone, and mixed with others, probably introduced.—*Jaffrey.*

(7878) STERCULIA PARVIFLORA: small flowered Sterculia. Abundant in the jungles of Ajmeer.—*Gen. Med. Top. p.* 202.

(7879) STERCULIA URENS. Byttneriaceæ, Roxb. c. 24 Stinging Sterculia.

Vellay pootallie marum, also Kavali, Tam.
Bulce, Beng.
Kateria kooli, also Kur Kutila, Hind.

A large tree, a native of the mountainous countries on the Coast of Coromandel, Hindoostan &c. common also in the Ajmeer hills, and in Kotah.—*Med. Top. p.*201. Leaves round, cordate and five-lobed; deciduous in the cold weather; flowers in February and March, very small; the carpel is covered with rigid bristly hairs, which puncture like the Mucuna pruriens. The bark of the trunk is white, and gives the tree a dead appearance. —*Riddell.* The kutila gond, is obtained in great abundance from this tree; the seeds of the stinging pods are palatable when roasted and very wholesome: many bushels must be yielded by one large tree, and the poor in famines should collect the seeds for food: the star-shaped pods are covered with stinging pubescence. The wood of this tree is soft and spongy, except towards the centre of arge trees, where it is reddish. Mr. Rohde does not know of any use it is put to except to make fuel. I observed, he says, that the water on which I kept the green branches for examination became hick, like clean glutinous jelly. Bark exceedingly stringent, tinges the spittle reddish. It yields a gum not unlike Tragacanth, and has been sent o London as such, but the artists, who used the gum, did not find it answer. The seeds are roasted and used by the natives as an article of diet and also as a dainty.—(*Roxb.*) *Rhode M. S. S.* The gum, which exudes spontaneously during the hot season, occurs in arge light brown transparent tough masses. mmersed in water they swell like a jelly, but o not dissolve but by protracted boiling. The olution is not adhesive, and is destitute of the hickness of solutions of ordinary gum. The ses of this gum are very limited: the want of dhesiveness renders it unsuitable for the arts, while its difficult solubility renders it inferior to most other gums for medicinal purposes. A imiliar gum called Kutira is afforded by the Cochlospermum gossypium of Coromandel, Travancore, and Ceylon, a large tree, with bright yellow flowers. For an account of properties and use of the true tragacanth gum, which the Kutira much resembles, see *Astragalus*, also *kuteera.* The roasted seeds, which contain starch and fixed oil, have much the flavour of chestnuts, and are eaten by the natives of this country —*O'Shaughnessy.* The wood of this very large tree is soft and loose grained, only fit for the most common purposes. The leaves when soaked in water have the property of rendering it ropy and glutinous. The bark yields a gum resembling gum tragacanth. —*Wight.*

The Gum.

Katila ka gond, Hind. | Tshaw, Burm.

The white transparent gum of the kur tree: tasteless and similar in property to tragacanth: swells exceedingly when placed in water but does not dissolve: in Medicine considered cooling and astringent, and given, in Ajmere, in "dai" and "luddoo."—*Gen. Med. Top.* Six species of *Sterculia*, four of which, *viz. Sterculia ramosa*, *S. fœtida*, *S. campanulata*, *S. piperfolia*, are very plentiful throughout the Pegu Province, yield a gum which is known in the bazars of Bengal under the name of Kotheela. The other two species, *Sterculia balangas* and *S. calorata*, are not so plentiful. This gum is probably analogous to the *Tragacanth*, which Dr. Lindley states is obtained from a species of *Sterculia* at Sierra Leone.—*McClelland.*

(7880) STERCULIA VILLOSA. A large tree; leaves palmated, five or seven-lobed.—*Riddell.*

(7881) STERCULIACEÆ, *Sterculiads*, a natural order of Plants belonging to the syncarpous group of Polypetalous Exogens. The plants belonging to this order are trees or shrubs, with alternate, stipulate, simple, often toothed, leaves, with a variable inflorescence, and a stellate pubescence. The calyx is either naked or surrounded with an involucre, consisting of five sepals, with a valvular or nearly valvular æstivation; five petals, hypogynous often saccate at the base: stamens definite or indefinite and monadelphous; anthers 2-celled; the pistil consists of five carpels, often surrounding a columnar gynophore; fruit a capsule with three or five cells; seeds often winged, sometimes woolly; albumen oily or fleshy, and embryo straight; cotyledons either flat and plaited or rolled round the plumule.

The order thus defined includes several groups of plants, which have by many writers been made to form distinct orders. Sterculiaceæ are most nearly allied to Malvaceæ from which they differ in the possession of 2-celled anthers. From Dipteraceæ and Tiliaceæ, to which they are allied by the valvate æstivation of the calyx, they differ in the possession of monadelphous stamens. The subdivisions of this order are marked by very evident peculiarities of structure.

Helictereæ have an irregular calyx and corolla.

Sterculieæ, no petals and definite stamens placed at the end of a long column.

Bombaceæ, a calyx with a ruptile dehiscence usually woolly seeds, and the cells of the anthers anfractuose.

Dombeyæ, a part of the stamens sterile, and flat; well formed petals.

Byttnerieæ, a part of the stamens steriles, and small petals bagged at the base.

Lasiopetaleæ, a petaloid calyx and rudimentary petal.

Hermannieæ, spirally twisted petals with only five stamens, and those opposite the petals.

Sterculiaceæ, are natives of India, Australia, the Cape of Good Hope, and South America with the West Indies. Most of its subdivisions have however a very definite Geographical range.

Sterculiaceæ, are found in India, and equinoctial Africa. The genus Sterculea contains many species that are used as food or medicines.

Byttnerieæ, are principally natives of South America and the West Indies, about one-seventh of the species are found in the East Indies, and the same proportion in Australia. To this group belongs the plant that produces the cocoa [Theobroma] of commerce. These plants, like the whole of the order and its allies, abound with mucilage and are often used in medicine as demulcents. The fruit of Guazuma ulmifolia possesses a mucilaginous pulp and is eaten in Mexico by man, but principally employed for feeding cattle. The bark of this plant is bitter, and is said to be serviceable in the horrible disease called Elephantiasis.

Hermannieæ —Two-thirds are found at the Cape of Good Hope; the remainder are natives of the East and West Indies, South America, and the islands of the Pacific. The species of *Waltheria* abound in mucilage, and are used in medicine as demulcents.

Dombeyæ are all African, East Indian, or South American. Their properties are similar to the preceding. One of the species, *Wallichia spectabilis*, forms a handsome tree, approaching the Linden, and points out a relation between this order and *Tiliaceæ*.

Lasiopetalæ are found entirely in Australia, and possess no remarkable properties. Further information on the properties of plants of this order might be arranged under BOMBACEÆ, ADANSONIA, STERCULIA, and THEOBROMA.—*Eng. Cyc.*

(7882) STEREOSPERMUM. Of this genus Wight gives, in Icones, Stereospermum chelonoides, 1341; suaveolens, 1342.

(7883) STEREOSPERMUM CHELONOIDES. *Bignoniaceæ*, Icon. 1341.

Velapanthric marum, TAM.

Usually pronounced padrie marum, the flowers are very fragrant, and the tree a very handsome one, though not large. It is probable there is some confusion in the specimens, as the proper padrie marum is reddish, and this is called the white padric, though the specimens seem to be the same as the other. This may easily happen, as the trees are very like, being principally distinguished by the colour of the flowers, yellowish on this, brownish purple in that. Hence, perhaps the two names, black and white pautheric. This is said to be the stronger wood of the two.—*Rohde.*

(7884) STEREOSPERMUM SUAVEOLENS. *Bignoniaceæ*, Icon. 1341.

Padrie marum. TAM. | Ooloonanthree Mara, CAN.

A middle sized three with pinnate leaves, and panicled inflorescence, very fragrant wood (according to Wight,) strong and elastic, said to be fitted for making bows. Wight No. 63, Mysore 38.—*M. E. J. R.* A considerable tree, frequent in the Walliar jungles, wood strong and elastic (said to be fitted for making bows), wood dark and good.—*Wight.*

(7885) STERNIDÆ, the name of a family of Web-footed, long-winged Birds, which are commonly known as Sea Swallows and Terns.—*Eng. Cyc.*

(7886) STEVIA PURPUREA. COMPOSITÆ. PUREA. These are pretty, small flowering plants, natives of new Spain and Mexico, propagated by seed, cuttings and division of the roots in any good garden soil.—*Riddell.*

(7887) STILAGINACEÆ, a small natural order of plants, belonging to the rectembryose group of Apetalous Exogens. They are trees or shrubs, with alternate simple stipulate leaves, the stipules being deciduous. The flowers are unisexual, mostly seated on amentiform spikes or racemes. Calyx 3-5-parted; stamens two or more, arising from an enlarged receptacle with capillary filaments and 2-lobed anthers dehiscing transversely; ovary superior, stigma sessile; fruit a drupe with one seed, which is pendulous; the embryo is green, lying in the midst of fleshy albumen. The species of this order are all of them natives of the East. In its relations this order is obscure. It has some resemblance to *Urticaceæ*, from which it is distinguished by its enlarged disc, its peculiar anthers, and unelastic filaments. In these characters it resembles *Henslowiaceæ*, but they differ from this order in having but one carpel and a single seed. Many of the fruits of this order have a pleasant subacid flavour, and are eaten by the natives of the East Indies.—*Eng. Cyc.*

(7888) STILAGO, a genus of Plants sometimes united with, at other times separated from the genus *Antidesma*, belonging to the natural family *Antidesmeæ*, which by some botanists is called *Stilaginace*. The species are few in number, forming shrubs and moderate-sized trees, which are found in Madagascar and Mauritius, as well as in some of the Indian islands, and in India, where the species extend even to northern parts. The genus is characterised by having diœcious flowers, the male having a 3- or 5-parted perianth. Stamens 2, 3, or 5, inserted in an annular disc with the rudiment of an ovary. The female flower has the perianth of the male, and the disc surrounding the base of the ovate single-celled ovary. Ovules 2, pendulous from the apex of the cell. Stigma sessile, 3- to 5-rayed. Drupes 1-seeded, crowned by the stigma, with the nut rugose both inside and out. Albumen fleshy, scrobiculate. Cotyledons foliaceous. Embryo inverse. The flowers are arranged in axillary catkin-like spikes. The leaves of *Antidesma alexiteria* are employed in the Mauritius as an antidote against snake-bites. Cordage is made with its bark, as well as with that of *A. Zeylanica* in Ceylon. The small fruits of both species are eaten and preserved: the fruits of *A. pubescens* (*Stilago*), *Bunias*, and *Diandra*, are eaten by the natives of India.—*Eng. Cyc* Wight, in I cones, gives Stilago Bunias, 819; lanceolaria, 766; pubescens, 821; tomentosa, 767 8.

(7889) STILAGO DIANDRA, *Antidesmeæ*, R. C. 166.

Asary poolic marum TAM. | Tengurec, BENG.
Tella Goomoodoo, TEL.

A tree, a native of the mountainous parts of the Circars. Roxburgh says the wood of this tree is put to various uses, but seems himself to be but little acquainted with it, judging from a branch specimen, nearly white at first, but becoming brownish by exposure to the air.—*Wight* The berries are eaten by the natives when ripe. The wood serves for various uses.—*Rohde M.S.S.*

(7890) STILLINGIA, a genus of Plants belonging to the natural order *Euphorbiaceæ*, so named in compliment to Dr. Stillingfleet, known as an English botanist. The genus now includes the species of *Sapium*, and is distinguished by one of its species being the famous Tallow-Tree of China. The generic character of *Stillingia* is; Flowers monœcious; males aggregate; calyx cup-shaped, crenulate, or bifid; stamens two, inserted; filaments united at the base; anthers opening outwards; female flowers solitary; calyx tridentate or trifid; ovary sessile, 3 celled, each cell with a single ovule; style short, thick; stigmas three, simple, spreading; capsule globose, tricoccous; cocci single seeded. The species consist of milky trees or shrubs found in the tropical parts of Asia and America, and likewise in the islands of Bourbon and Mauritius. The leaves are alternate, petiolate; petioles bi-glandular at the apex. Male flowers usually crowded in terminal spikes, supported at the base by a bi-glandular bract. The female flower is commonly below the spike, sometimes sub solitary on another branch.—*Eng. Cyc.*

(7891) STILLINGIA SEBIFERA, the Tallow-Tree of China, at one time attracted considerable attention, and was introduced into various European colonies in the East and West Indies. It may be met with in English hothouses. Dr. Roxburgh describes the plant as common in his time about Calcutta, but that it did not yield any useful product, and was therefore only an ornamental tree, being in flower and fruit most parts of the year. It is found in China on the borders of rivulets, and is also cultivated. It grows to the height of a pear-tree, having a trunk and branches like the cherry, and foliage like the black poplar, but which turns red in autumn. It was met with in Chusan by the late expedition, and seeds sent home by Dr. Cantor, which have been sown in the Horticultural Society's Garden at Chiswick. The fruit of this tree furnishes the Chinese with candles, and oil for their lamps. The seed-vessels and seeds are bruised, and then boiled in water. The fatty particles rising to the surface are skimmed off, and on cooling condense into tallow. To give it greater consistence some wax is added, together with linseed-oil in the proportion of three parts to ten of the tallow. The candles made with it are beautifully white. Sometimes they are coloured red by the addition of vermilion. These candles are sometimes said to be coated with wax procured from another Chinese tree (probably *Ligustrum lucidum*,) which forms an external crust and prevents them running. This tallow is also employed in medicine instead of lard.—*Eng. Cyc.* The kernel of the seeds of the tallow tree of China, Stillingia sebifera, says Simmonds, contains an oil, which, when expressed, consolidates through the cold to the consistence of tallow, and by boiling, becomes as hard as bees' wax. The plant also yields a bland oil. A similar fatty product is obtained from a shrub in British Guiana the Myristica (Virola) sebifera. *Simmonds.* The celebrated tallow tree (Stillingia) symmetrical shaped tree, is a native of all the eastern provinces of China, and resembles the aspen in the form and colour of the leaf, and in its general contour.—*Williams, Middle Kingd. page* 282. According to Mr. Williams the tallow tree (*Stillingia sebifera*) occurs over all the eastern part of China, and when fully grown is a beautiful tree, resembling the aspen in its shape and foliage; it would form a valuable addition to the list of shade trees in Britain. The seeds grow in clusters like ivy berries, and are collected in November; when ripe, the capsule divides, and falling off discovers two or three kernels covered with the pure white tallow. When the tallow is to be prepared, these are picked from the stalks and put into an open wooden cylinder with a perforated bottom, in which they are well steamed, over boiling water. In ten or fifteen minutes, the tallow covering the seeds becomes soft, and they are then thrown into a stone mortar and gently beaten with a mallet to detach it. The whole is then sifted on a hot sieve, by which the tallow is separated from the kernels, though containing the brown skin which envelops the latter, and presenting a dirty appearance. The tallow in this state is inclosed in a straw cylinder, or laid upon layers of straw held together by iron hoops, and subjected to pressure in a rude press from which it runs clear in a semifluid state, and soon hardens into cakes. The candles made from it become soft in hot weather, and are sometimes coated by dipping them in colored wax.—*Williams' Middle Kingdom, Vol.* II, *page* 107. The tallow tree (Stillingia sebifera) is abundant in the valleys of Chusan, and large quantities of tallow and oil are yearly extracted from its seeds: tallow mills are erected in several parts of the island for this purpose. The Laurus Camphora, or camphor tree, is also abundant, but no camphor is extracted or exported from the island. *Fortune's Wandering, page* 67. At another place, he says, for the following account of the Chinese method of extracting the tallow from the seeds of the *Stillingia Sebifera*, I am indebted to Dr. Rawes, of the Madras army, who was some time a resident in the island of Chusan; "The seeds are picked at the commencement of the cold weather, in November and December, when all the leaves have fallen from the trees, this I saw at Sing-kong when out shooting in the sah-hoo-valley close by our quarters, through the village. The seeds are in the first place taken to the building where the process of making the tallow is carried on, and picked and separated from the stalks. They are then put into a wooden cylinder, open at the top, but with a perforated bottom. This is placed over an iron vessel (about the same diameter or rather larger than the wooden cylinder, and about six or eight inches deep) containing water, by which means the seeds are well steamed, for the purpose of softening the tallow and causing it more readily to separate. The furnace I saw had four or five iron vessels in a row, was about three feet high, four or five feet broad and eight or ten feet long. The fire was placed at one end and fed with the husk of the rice, dry grass, and such like cheap materials which make a great flame, and the flue was of course carried directly under the whole of the iron vessels. "When the seeds have steamed ten minutes or a quarter of an hour, they are thrown into a large stone mortar and are gently beaten by two men with stone mallets for the purpose of detaching the tallow from the other parts of the seed. They are then thrown upon a sieve heated over the fire, and sifted, by which process the tallow is separated, or nearly so, although they generally undergo the process of steaming &c. a second time that nothing may be lost. The other part of the seed is ground and pressed for oil. "The tallow now resembles coarse linseed meal, but with more white spots in it and derives its brown colour from the thin covering over the seed (between it and the tallow) which is separated by the pounding and sifting. In this state it is put between circles of twisted straw, five or six of which are laid upon each other, and thus forming a hollow cylinder for its reception. When this straw cylinder (we may call it so) has been filled, it is carried away and placed in the press, which is a very rude and simple contrivance, but which like every thing Chinese, answers the purpose remarkably well. The press consists of longitudinal beams of considerable thickness, placed about a foot and a half, or two feet, asunder, with a thick plank at the bottom, forming a kind of trough, and the whole is bound together with iron. The tallow is pressed out by means of wedges driven in very lightly with stone mallets, and passes through a hole in the bottom of the press into a tub, which is sunk there to receive it. It is now freed from all impurities, and is a semifluid of a beautiful white colour, but soon gets solid, and in cold weather is very brittle. The inside of the tubs which collect the tallow are sprinkled or dusted over, with a fine red earth, well dried, which prevents the tallow from adhering to their sides. It is thus easily removed in a solid state from the tubs, and in this condition the cakes are exposed for sale in the market. As the candles made from this vegetable tallow have a tendency to get soft and to melt in hot weather, they are commonly dipped in wax of various colours as red, green and yellow. Those which are intended for religious purposes are generally very large, and finely ornamented with golden characters. The cake, or refuse, which remains after the tallow has been pressed out of it, is used for fuel, or to manure the land, and so is the refuse from the other part of the seeds from which oil is extracted.—*Fortune.*

(7892) STIPA, a genus of Grasses belonging to the tribe *Stipaceæ*. It has stalked florets, the paleæ coriaceous, the inner entire. *S. pennata*, the only British species, has a very long twisted feathery awn, with a glabrous base. It is a very beautiful plant, and is common in English gardens. Found on rocks in Long Seadale near Kendal.—*Eng. Cyc.* This beautiful species of grass is grown chiefly in gardens for the sake of the beautifully feathered heads.—*Riddell*

(7893) STIZOLOBIUM, a genus of Plants which was so named by Persoon, from στίζω to prick, and λοβός, a lobe or pod, from the pods of the several species being covered with hispid hairs. The species have now been removed chiefly to *Pachyrhizus* [DOLICHOS] and to *Mucuna*; of the latter of these *Stizolobium* now forms a sub genus. The principal species are mentioned under COWITCH and MUCUNA. Cowitch is no doubt a corruption of the Hindustanee name Kiwach, which is the *Mucuna prurita* of Hooker, ndigenous in various parts of India, but usually confounded with *M. pruriens*, a native of the West India Islands. The Indian *M. pru-ita* is distinguished by its smaller leaves, ts more obtuse leaflets, the middle on being nore truly rhomboidal, its flowers more contantly in threes, and by its legumes being nuch broader, compressed, and free from any aised line on the back of the valve, whilst in the American *M. pruriens* the pods are narrower, erete, and keeled on the valves. Another valuable but little known species is *M. utilis*, the Bois Noire of the islands of Mauritius and Bourbon, and thought to be a native of Arabia. t is universally employed in the above islands for enriching the soil for the cultivation of sugar. The thick covering of herbage with which the soil becomes covered, must be useful in preventing he soil from becoming parched, while the whole crop, being afterwards ploughed in, is found to be eminently useful in enriching the soil. The seed has been introduced into India and is spreading over the country.—*Eng. Cyc.*

(7894) STIZOLOBIUM ALTISSIMUM.—ASSAM BEAN.

Kalee Seem. DUK.

This bean is grown like most others, and may be first sown at the commencement of the rains and continued during the cold season.—*Riddell.*

(7895) STOMAPODA. M. Milne-Edwards comprises in the order *Stomapoda* all the Podophthalmous *Crustacea* which are deprived of thoracic branchiæ lodged in interal cavities. This division is entirely composed of Swimming Crustaceans, whose body is elongated, and whose general form often approaches closely to that of the Macrourous Decapods; but in those animals the concentration of the rings of the head and thorax is carried less far.

(7896) *Lucifer Typus.*—This species differs from the only other, *Reynaudii*, (which was found in the Indian Ocean by M. Reynaud) in the form of the median piece of the caudal fin, which is lamellar, and without any notch below, in the more considerable length of the middle blades, and in the apparent absence of a separation between the carapace and oculiferous prolongation.

(7897) *Squilla.* (Rondeletius).

(7898) *Squilla Maculata.* Length from 10 to 12 inches. It inhabits the Asiatic seas.

(7899) *Squilla Stilifera.* Length about 3 inches. It is a native of the island of Mauritius.

(7900) *Gonodactylus* (Latreille).

(7901) *Gonodactylus Chiragra.* Length about 3¼ inches. The species are found in all the seas of warm climates: the Mediterranean, American coasts, Seychelles Islands, near Trincomalee, and Tongataboo.

(7902) *Gonodactylus Scyllarus.* Length about 4½ inches. It is found in the Indian Seas and on the coasts of Mauritius.

(7903) STONE. *Working in stone*, polishing the hardest surfaces, engraving its surface with imperishable records, and sculpturing it into various forms, even excavating gigantic temples out of the solid rock, are all departments of sculpture and engraving to which the Hindoos have paid attention from the earliest times; and their buildings are conspicuous for a quality for which those of Egypt have often been admired, that is, the exquisite polish and glass like appearance of some of the hardest granite &c. Kennedy has fortunately given us an account of the process by which they effect this. "The tools," he says, "which the Hindoos use are a small steel chisel and an iron mallet. The chisel, in length, is not more than about twice the breadth of the hand of the Hindoo workman; which, as is well known, is very small; and it tapers to a round point like a drawing-pencil. The mallet, also in iron, a little larger than the chisel, but not weighing more than a few pounds. It has a head fixed on at right angles to the handle, with only one striking face, which is formed into a tolerably deep hollow and *lined with lead.* With such simple instruments they formed, fashioned, and scooped the granite rock which forms the stupendous fortress of Dowlatabad, and excavated the wonderful caverns of Ellora; for it seems by no means probable that the Hindoo stonecutters ever worked with any other tools." Dr. Kennedy adds, "The traces of the pointed chisel are still visible on the rocks of Dowlatabad, as they are also on some of the great works of Egypt. The stone having been brought to a smooth surface, it is next dressed with water in the usual way, and is then polished in the following manner. A block of granite, of considerable size, is rudely fashioned into the shape of the end of a large pestle. The lower face of this is hollowed out into a cavity, and this is filled with a mass composed of pounded corundum-stone, mixed with melted bees-wax. This block is moved by means of two sticks, or pieces of bamboo, placed on each side of its neck, and bound together by cords, twisted and tightened by sticks. The weight of the whole is such as two workmen can easily manage. They seat themselves upon, or close to, the stone they are to polish, and by moving the block backwards and forwards between them, the polish is given by the friction of the mass of wax (and lac?) and corundum."—*Royle* Nearly the same materials, and with a still greater degree of success are employed in polishing such delicate articles as beads and bracelets; elegantly shaped cups, or the models of cannon. Of the processes employed a very interesting account, which is published in the "Illustrated Catalogue," is given by Mr. Summer of Cambay. The stones are first fixed on a steel spike, and there roughly rounded with an iron hammer, and then polished with a composition of lac and corundum variously applied. The holes are bored with a steel drill, tipped with a small diamond. Cups and saucers and similar hollow articles, are wrought, according to the required external shape on the steel spike, and a rough polish given on the rough polishing stones. The cavity is formed by the diamond-tipped drill to the depth of one-fourth of an inch all over the space, until it exhibits an honey-combed appearance; the prominent places round the holes are then chipped away; and this process is repeated until the depth and form desired are obtained. They are then polished upon prepared moulds of convex forms, and of the same composition as the polishing-plates which are attached to the turning-wheel. --*Royle, Arts &c. of India, page* 513 *and* 515.

(7904) STORAX.

Usteruck, Salajet, Meah, Arab.
Storace, It.
Styrax, Lat.
Storax, Fr.
Stryax-broom, Ger.
Azumbar, Sp.

The produce of a tree (*Styrax officinale*), growing in the South of Europe and the Levant. It is usually met with in tears, which is pure; and in lumps or *red storax*, which is mixed with saw dust and other impurities. Storax has a fragrant odour, and a pleasant, sub-acidulous, slightly pungent, and aromatic taste; it is of a reddish brown colour, and brittle. (*McCulloch.*) —*Faulkner*.

(7905) STORAX LIQUID, Sillarus; Rose Mallows.

Sillarus, Miati-lubni Meih-katar, Arab.
Sillarus Meih-Seela, Guz, Hind. Pers.

Liquid storax is usually more or less opaque, of the consistence of bird-lime, grayish colour, warm balsamic taste, and peculiar vanilla-like odour, if pure. Small quantites are imported annually into Bombay from Suez and the Arabian Gulf in skins; it is re-exported to England and China under the designations of Rose Mallows (Rosa mallos) and Sillarus, in barrels of about four imperial gallons capacity each.—*Faulkner*. See Ambar, Liquid, also Liquidambar.

(7906) STRAWBERRY, the English name of the fruit and plant of the *Fragaria*, a genus of plants belonging to the natural order *Rosaceæ*. The fruit of the *Fragaria* is one of the most delicious of England's summer fruits. The name *Fragaria* is derived from the Latin *Fragum*: and the English name from the practice in that country of cultivating the plant with straw surrounding it. The genus *Fragaria* is known in its family by possessing a calyx with a concave tube, the limb of which is 10-parted, and the outer 5 segments accessory; 5 petals; stamens and carpels indefinite, the latter placed upon a fleshy and succulent receptacle, forming the juicy and succulent part of the fruit. The species are perennial plants, throwing out runners; the leaves are trifoliate, each leaflet being coarsely toothed; the receptacle on which is seated the carpels, and which is called the fruit, is round, and assumes a variety of colours from a scarcely perceptible pink to a dark red. Several species of this genus have been described. Linnæus gave only two; but Wildenow admitted eight; and Don, in 'Miller's Dictionary,' enumerates fourteen. Duchesne, who is followed by many French botanists, makes only two species, and makes the species of other writers varieties of these. All of them are natives of temperate or cold climates; and are found in Europe, America, and the mountains of Asia.—*Eng. Cyc.* Mr. Mason raised very fine strawberries in his garden at Tavoy, but the plants required considerable care.—*Mason*. The yellow flowered Indian Strawberry in the Terai ascends 7500 on the mountains.—*Hooker Him. Jour., p.* 395.

(7907) *Fargaria Chilensis*, Chili Srawberry, is a native of South America, both in Chili and Peru.

(7908) *Fragaria Collina*, the Hill Srawberry, has the sepals erect after flowering, and the hairs on the peduncles and calyx erect. This species is a native of Switzerland and Germany, and is characterised by its producing green fruit. The varieties of strawberries which are called Green are the produce of this species. In flavour and size they are only a second-rate strawberry.

(7909) *Fragaria elatior*, the Hautbois Strawberry, has the sepals reflexed on the peduncle, the hairs of the peduncles and petioles extending horizontally. It is a native of North America, and is occasionally found in groves in the south of England. The shape, size, and colour of the fruit of the Hautbois are subject to great varieties, according to its mode of cultivation. It is the parent of a great number of sorts known in gardens, most of which, when properly managed, produce fruits of a first-rate kind.

(7910) *Fragaria grandiflora*, large-flowered Strawberry, is a native of Surinam, and has furnished English gardens with the sorts called Pine strawberries.

(7911) *Fragaria Majaufea*, the Majaufe of the French.

(7912) *Fragaria vesca*. Wood or Alpine Strawberry, has plicate leaves, pilose beneath; the sepals reflexed and the hairs on the peduncle pressed down. It is found wild in woods and on hill-sides throughout Europe, and is abundant in Great Britain. Duchesne describes eight varieties of this species, mostly characterised by the different form of the fruit or fleshy receptacle. Many of these produce the cultivated varieties which are known in gardens. The *F. v. semperflorens* produces the Red, the White, the American, and Danish Alpine strawberries, all of which are of a fine flavour, and greatly valued.

F. v. minor produces the Red Wood-Strawberry, or Frasier d'Angleterre, and the White Wood-Strawberry, both very fine kinds. To the *F. v. flagellis* belongs the Red and White Alpine Bush-Strawberry, but these do not produce so good fruit as the last.

(7913) *Fragaria Virginiana*, the Virginian Strawberry.—*Eng. Cyc.*

Dr. Riddell gives the following instructions on the cultivation of strawberries in the Dekhan :—

General Observations.—" *The Strawberry* multiplies itself from runners and suckers ; the old plant, after it has ceased bearing, throwing them out. As soon as the rains have set in, these runners may be removed into a nursery bed, for their being more easily looked after, and should have the space of nine or ten inches allowed between them : they will throw out other runners, the whole of which may be separated and transplanted at the proper season. They thrive best in a light soil with good old stable and vegetable manure at first, and as soon as they show a disposition to flower, may have old goats' or sheep's manure added around each plant, a couple of a double handsful being sufficient. In no part of the Deccan, should the plants be put out for fruiting before the close of the rains, the latter part of September being quite early enough. Suckers which I planted for experiment at the commencement of August, grew to a good size, and did nothing for ten or twelve weeks but throw out suckers, which were continually removed, and after all fruited badly : the finest and most prolific crop were got from suckers put out in the beginning of October. Some strawberries were gathered in November from the plants put out in August, but they were so few as in no way to induce me to try the experiment again. Varieties can only be procured from seed ; and to procure the seed, select the finest ripe fruit, rub it on a sheet of paper, and dry it. When the rains commence, soak the seed in water, reject all that float, the remainder sow in baskets in a light loam, when they will be fit to remove in about six weeks, and should be put in other baskets four or five inches apart, and taken care of until ready to be transplanted into beds, where they are to remain. As these plants throw out suckers very fast, they must be constantly looked after, and removed unless you have a scarcity of plants. They will commence bearing in six months from the time of sowing the seed. You may, as soon as the rains have ceased, put your suckers that have rooted into square beds, each not less than one foot apart, five in a row : this will give you twenty-five in each bed—as many as can be easily looked after and gathered without trampling on the bed and thereby injuring the plants. When the earth is of a clayey consistence, I have seen the strawberry cultivated on ridges. Some think this is a good plan, but I prefer the beds : however, it can be easily tried. It is sometimes necessary, in consequence of flooding the beds, to put tiles under the fruit to keep it clean, but it also attracts the notice of the birds : if straw or grass be used, then the chances are that white ants destroy your plants. This it is that makes some persons prefer the ridge system of growing, as they say the fruit is cleaner in consequence : all I know is, that fine fruit may be grown either way ; and if on ridges, the same distance must be allowed between the plants as in beds—and even in the latter the plants may be put on raised cones of earth. The common vegetable manure is all that is required at first until near flowering, when a handful or two of goat's or sheep's dung should be put round the plant, opening the earth and scraping it together. Water during the evening and very early in the morning."—*Riddell.*

(7914) STREPTOCARPUS. BIGNONIACEÆ. This is a handsome plant from the Cape of Good Hope, produces abundance of pale, purple flowers, it requires a good garden soil, and is increased by seed.—*Eng. Cyc.*

(7915) STRIGIDÆ. The Owls. This family of Birds, includes the Nocturnal Birds of Prey. The following table gives Mr. Swainson's arrangement for the entire family.

	Genera.
1. Typical Group.—Ears large, operculated, no egrets,… …	*Strix.*
2. Subtypical.—Ears smaller, no operculum, egrets,…………	*Asio.*
Ears small, no egrets or operculum, disc imperfect.	
3. Aberrant.—Head small, claws feathered, tail short………	*Nyctea.*
Head large, claws naked, tail moderate……… …………	*Nyctipetes.*
Head small, claws feathered, tail wedged………………	*Surnia.*

Mr. G. R. Gray makes the *Accipitres Nocturni* the second sub-order of his first order *Accipitres.* His third family, the first of that suborder, is formed of the *Strigidæ*, which are thus subdivided by him :—

Sub-Family 1.—*Surninæ*,

Genera.—*Surnia*, Dum. (*Syrnia*, Steph., *Strix*, Gm.); *Accaba*, Wagl. (*Surnia*, Cuv., *Strix*, Shaw); *Nyctea*, Steph. (*Noctua*, Cuv., *Nyctia*, Sw.); *Athene*, Boie (*Nyctipetes*, Sw., *Strix*, Daud.); *Huhua*, Hodgs.

Sub-Family 2.—*Buboninæ.*

Genera.—*Scops*, Sav., (*Scops* Sav., *Asio*, Briss., *Otus*, Less., *Strix*, Linn.) ; *Lophostrix*, Less., *Ketupu*, Less. (*Cultrunguis*, Hodgs., *Strix*, Gm.,) ; *Bubo*, Sibb. (*Feliceps*, Barr., *Asio*, Antiq., *Ulula*, Bonap *Heliaptex*, Sw., *Ascalaphus* J. Geoff., *Strix*, Linn.).

Sub-Family 3.—*Ululinæ.*

Genera.—*Syrnium*, Sav., (*Scotiaptex*, Sw., *Ulula*, Briss., *Strix*, Linn.,) ; *Otus*, Day (*Asio*, Briss., *Brachyotus*, Gould, *Strix*, Linn. ; *Urrua*, Hodgs. ; *Nyctalops*, Wagl. ; *Ulula*, Cuv. (*Strix* Gm.) ; *Glaucidium*, Boie (*Stix*, Linn., *Noctua*, Cuv., *Athene*, Boie) ; *Nyctale*, Brehm. (*Scotophilus*, Sw., *Nudipedes* and *Ptilipedes*, Less., *Strix*, Bechst., *Athene*, Boie) ; *Ninox*, Hodgson.

Sub-Family 4.—*Striginæ.*

Genera.—*Strix*, Linn. ; *Pholidus*, J. Geoff. (*Strix*, Horsf,) ; *Bulaca*, Hodgson.

The geographical distribution of this family is very wide ; extending as high as the Polar Sea, where *Stryx Nyctea* is recorded by Sabine as having been seen on the islands in the summer months, and by Sir James Ross as having been observed about Victoria Harbour throughout the winter, where several pairs had bred in the preceding autumn ; and as low at least as Port Famine in the Straits of Magellan. *Strix rufipes* and *S. nana*, &c., King). Species are found in Europe, Asia, Africa, America, and in Australia. They feed on birds and quadrupeds, and even fish (in the case of *Strix nyctea* and *S. flammea*), according to the size of the species. Hares, partridges, grouse, and even the turkey, are attacked by the larger horned owls of Europe and America ; while mice, shrews, small birds, snakes, and crabs suffice from the inferior strength of the smaller *Strigidæ*. Mr. Yarrell states that the Short-Eared Owl (*Strix brachyotus*) is the only bird of prey in which he ever found the remains of a bat.

(7916) *Strix flammea*, the common White or Barn-Owl, is the Effraie, Fresaie, and Petit Chathuant Plombé of the French ; Barbagianni, Alloco Commune e Bianco of the Italians ; Schleierkauz, Perlschlierkautz, and Perl-Eule of the Germans ; De Kerkuil of the Netherlands ; Barn-Owl, White Owl, Church Owl, Gillihowlet, Howlet, Madge-Howlet, Madge-Owl, Hissing-Owl, and Screech-Owl of the English ; and Dylluan Wen of the Welsh. The upper parts are bright yellowish, varied with gray and brown zig-zag lines, and sprinkled with a multitude of small whitish dots ; face and throat white ; lower parts in some individuals rusty-white, sprinkled with small brown dots ; in others bright white, marked with small brownish points ; in others again without the slightest appearance of spots ; feet and toes covered with a very short down, more scanty on the toes : iris yellow. Length about 13 inches. In the female all the tints are brighter, and more developed. The young are covered with a thick white down, and remain long in the nest. Mr Blyth states that the first set of feathers grows very slowly, and is not moulted till the second autumn.

Varieties.—Whitish, or entirely white.

This bird is common in England and Ireland, less common in Scotland. Not common in the Orkneys, but present in some of the islands. Found in Denmark, but said not to inhabit Sweden or Norway ; generally spread over temperate Europe : found in Madeira ; common in Lorraine ; extending in Africa from the north to the Cape of Good Hope ; met with in India, Japan, and Australia.

(7917) *Strix badia*, Horsf., Wowo-wiwi, or Kolongwiwi of the Javanese, is an Asiatic species. Dr. Horsfield states that this species, whose head is proportionally large, has a general resemblance to *S. flammea* in the distribution of its colours and external marks. The upper parts are, he observes, generally dark, and the lower of a paler hue. The neck is surrounded by a loose ornamental collar ; the plumes encircling the eyes are rigid, and disposed with perfect regularity, and the legs are entirely covered. A resemblance also exists, he adds, in the lustre of their covering. It is a native of Java, in the closest forests of the district of Pugar, and the ranges of low hills south of the capital of Surakarta. (Horsfield.) The habits of this species are nocturnal. Dr. Horsfield speaking of *S. Javanica* (which, he says, his specimens show to be merely a variety of *S. flammea*), remarks, that it is the only species of this division which is occasionally found near villages and dwellings. The same author states that eight species of owl from Java have been arranged in the museum at the India House ; three eared-owls, and five smooth-headed. —*Eng. Cyc.*

(7918) STROMBIDÆ, a family of Marine Gasteropodous *Mollusca*, belonging to the *Alata* of Lamarck and the *Angyostomata* of De Blainville. In this article the *Strombidæ* will be confined to the genera and sub-genera *Strombus*, *Pteroceras* and *Rostellaria*.

(7919) *Strombus*. There are about 60 recent species of *Strombus* described. Five fossil forms have been described from the Chalk and three from the Miocene beds of the Tertiary.

The species are extremely numerous, and many of them are gigantic in size, the well-known *S. gigas* of the West Indies for example. Like some others of the Turbinated Testaceans, the animals of the genus *Strombus* occasionally produce pearls. Mr. Wood, in his Zoography relates that he saw a pink pearl which was taken from the body of the animal of *S. gigas*, which is fished for the table off the island of Barbadoes. The pearl was discovered by chance while the men were employed in cleaning the fish. Its weight was 24 grains, but it would have been more valuable if it had been round. The same author states that only four of these pearls had been discovered in the vast number of shell-flesh that are annually brought to market in that part of the world, though he has reason to believe that this is in some measure owing to the carelessness of the negroes, who clean their fish without consideration, and have probably in their hurry returned many a pearl to its native element with the refuse of the animal. This pearl was exactly of the same colour as the interior coat of the shell, and like it in every respect except in figure. Immense quantities of this shell are imported into England from the Bahamas; 300,000 were imported into Liverpool alone in the year 1850. They are used in making cameos, and in the manufacture of porcelain. The species are found in the seas of warm climates; many from those of India, and some from those under and near the equator. They are carnivorous. Species have been found at depths varying from the surface to 13 fathoms.

(7920) *Strombus latissimus* has the shell turbinated, ventricose, smooth on the back, somewhat wrinkled on the wing, brown-orange spotted with white; the spire short and nodulous; the external lip very broad, rounded above, projecting beyond the spire; the anterior margin sharp, but the side of it very thick; the aperture smooth and white, tinged with rose colour. It is found in the East Indian seas.—*Eng. Cyc.*

(7921) *Pteroceras.*—Shell with the wing digitated, and furnished forwards with an elongated canal. There are 10 recent species, inhabitants of the Indian seas, and 100 fossil species, found from the Lias beds up to the Chalk.

(7922) *Pteroceras scorpius.* Shell ovate oblong, gibbous, tuberculate, transversely rugose and knotty, 7-fingered, white spotted with rufous; the fingers rather slender, and knotted at intervals throughout their length; the anterior ones and the tail the longest, and curved; aperture violaceous red wrinkled with white. It is a native of the East Indian seas.—*Eng. Cyc.*

(7923) *Rostellaria.*—Animal imperfectly known, but bearing a considerable resemblance to that of *Murex*, according to Cuvier. The species are found in the Asiatic seas, if we except *Rostellaria Pes Pelecani* and *R. Pes Carbonis* (genus *Aporrhais*), which are found in the Mediterranean and other European seas. A very fine specimen of *Rostellaria rectirostris* was brought up in the mud lying on the fluke of an Indiaman's anchor, in the Straits of Macassar. They are carnivorous. There are 7 recent species, and 70 fossil species. The latter range from the Neocomian beds to the Chalk.

(7924) *Rostellaria curvirostris* (*Strombus fusus*, Linn.) the spindle of collectors, is by far the most common of the Asiatic species.—*Eng. Cyc.*

(7925) STROPHANTHUS. There is a shrub about Amherst that bears a flower resembling the nerium, but with very long linear filiments to the end of each segment of the corolla. It is a species of Strophanthus and well deserving of cultivation.—*Mason.*

(7926) STRUTHIONIDÆ, a natural family of Terrestrial Birds, in which the locomotive energy is thrown into the lower extremities, the wings being in no case adequate to raising the body into the air, and in the majority of instances merely rudimentary. In this respect the genera which compose it are the very reverse of the Humming-Birds, Swallows, Albatrosses, Tropic-Birds, and Man-of-War-Bird; for in the latter the moving-power resides in the highly-developed wings, whilst the feet, especially in the Man-of-War-Bird, are feeble. The *Struthionidæ* consist of the Ostrich, American Ostrich (*Rhea*), Cassowary, Australian Cassowary, or Emu, and that extraordinary bird the Kivi-Kivi, or *Apteryx*, of New Zealand. The anatomy of these animals is referred to in great detail by Professor Owen in his paper on the 'Anatomy of the Apteryx,' in the Transactions of the Zoological Society, London. The most remarkable modifications of the skull in this family occur in the Asiatic Cassowary and the *Apteryx*. In the former the bony crest which is so highly developed in the adult, is hardly perceptible in the young bird, but increases with age, as in the Hornbill and the Guinea Hen [Pavonidæ] —*English Cyclopædia, page* 932.

Mr. G. R. Gray makes the *Struthionidæ* the first family of the order *Cursores*, Temm., the sixth order in Mr. Gray's arrangement, and includes under it the following sub-family and genera:—

Sub-Family 1. *Struthionidæ.*

Genera:—*Struthio*, Linn.; *Casuarius*, Briss.; *Dromaius*, Vieill.; and *Rhea*, Briss.

Sub-Family 2. *Apteryginæ.*

Genus:—*Apteryx*, Shaw.

Sub-Family 3. *Didinæ* (?).

Genus:—*Didus*, Linn.

Sub-Family 4. *Otinæ.*

Genera:—*Otis*, Linn; *Tetrax* Leach; *Sypheotipes*, Less.; *Chlamydotis*, Less.; and *Eupodotis*, Less.

The *Struthionidæ* are placed in Mr. Gray's arrangement between the *Tinamidæ*, the last family of his *Rasores*, and the *Charadriadæ* the first family of his *Grallatores.*

Amongst the *Mammalia* the *Marsupiata* make the nearest approximation to the *Ovipara*; and amongst the birds the *Struthionidæ* approach the Mammals and the Reptiles.

This approximation of Struthious Birds to the *Mammalia* especially cannot fail to strike the physiologist. In the first and typical genus, *Struthio*, it is strongly manifested.

(7927) *Struthio.* Linn. The Ostrich. Jouch, Jaanah and Rinonim of Scripture.

Neamah, also Thar-ood-jemmel, Arab.
Strutho camelos, Ger.
Autruche, Fr.
Struthio camelus, Lat.
Struzzo, also Struzzulo, It.
Strausse, Germ.
Shutr-murgh, Per.

Bill moderate, obtuse, straight, depressed at the point, which is rounded and unguiculate; mandibles equal and flexible; nasal fossæ longitudinal, prolonged half way down the bill, open. Feet very robust; toes two only, stout and strong, directed forwards, and connected at their base by a strong membrane, the internal toe considerably larger than the external, and furnished with a thick and hoof-like claw, external toe clawless. Wings useless for flight, furnished with long soft undulating plumes, and armed with two spurs, or rather two plumeless shafts, not unlike a porcupine's quill. Head and upper half of the neck scantily covered with a thin down, through which the colour of the skin is visible. There is but one species, the *S. Camelus*.

It would be a needless occupation of space to give a minute description of a bird which is so well known in these days of zoological societies and menageries. The Ostrich is generally understood to be the bird designated by the terms Joneh, or Jaanah, and Rinonim in the Scriptures (Levit, xi. 19; Deut., xiv. 15; Job, xxx. 29; Isai., xiii. 21; xxxiv. 13; xliii. 20; Jer., 1. 39; Lament., iv. 3; Mic., i 8; Job, xxxix. 13). In many of these passages, Jer., 1. 39, and Isai., for instance, our version reads 'Owls,' and in Levit. does not mention the Ostrich, but the general opinion seems to be in favour of the Ostrich being intended. It is the Neamah of the Arabs, Thar Edjammel (Camel-Bird) of the Orientals, Στρουθοκάμηλος of the Greeks, *Struthio-camelus* of Pliny and the Romans, Struzzo and Struzzolo of the Italians, Strauss of the Germans, Autruche of the French.

The approximation in the digestive organs of the Ostrich to the structure of some of the parts in the *Ruminantia*, especially in the additional ventricle of the bird, is still further strengthened by the bisulcous foot, which may not be inaptly compared to that of the camel, and probably led in no small degree to its appellation of Camel-Bird, to which, moreover, its height, lengthened neck, habit of frequenting the desert, and patience under thirst may have contributed. The food of the ostrich consists of vegetable substances only, but seeds and grain appear to be preferred, and it is consequently a most unwelcome neighbour to the cultivator of the soil, on whose crops the bird commits great devastation. Its iron-eating propensities have long been celebrated, and indeed it picks up and swallows any mineral substance, metallic or not, with indiscriminating voracity. Nor is this propensity confined to the devouring of minerals; for leather, hair, cordage, and wood do not seem to come amiss. In the stomach of one of these birds Valisnieri found a farago of grass, nuts, cords, stones, glass, brass, iron, tin, copper, lead, wood, and among the stones one weighing more than a pound. Perrault took from an ostrich's stomach 70 roubles, the greater part of which were worn down three-fourths of their substance by collision against each other or the pebbles found with them: those which were bent were worn and polished on the convex side, while they remained entire on the concave surface. These copper pieces had tinged everything in the stomach with green. This eagerness for picking up everything, whether or not it can be assimilated or can assist in the grinding down of the food by the action of the stomach, to which no doubt the polishing and wasting of the pieces of money mentioned by Perrault were due, is often fatal to the Ostrich. Too great a quantity of copper or iron thus taken into the stomach has caused the death of the bird. Valisnieri saw one killed by swallowing a quantity of quick-lime; and one kept in the gardens of the Zoological Society of London was first deformed and afterwards died from swallowing part of a parasol. Some of the heterogeneous contents found in the stomachs of these birds are preserved in the Museum of the Royal College of Surgeons. Their speed is great. The swiftest greyhound cannot overtake them; and even the Arab and his horse are obliged to have recourse to cunning as well as speed to close the chase, by throwing a stick dexterously between its legs, or otherwise to disable it. In its flight it spurns the pebbles behind it like shot against the pursuer. Nor is this its only mode of annoyance. Dr. Shaw, who gives a pretty account of the airs which the Ostrich plays off in a domesticated state fanning itself with its expanded wings, and seeming to admire its own shadow, states, that though tame and tractable to those familiar with them, these birds were often very fierce to strangers, especially those of the poorer sort, whom they would try to run down and attack with their feet. They are capable of striking with great force, and the same author gives a melancholy account of a person whose belly was ripped up by a stroke from the pointed and angular claw. The European sportsman, after riding so that the bird shall pass within shot, dismounts and brings it down with the rifle. The strength of the Ostrich is great. Adanson mentions the rapidity with which a large tame one ran, first under the weight of two little blacks, and afterwards under two full-grown negroes, while a smaller bird carried with equal facility one full-grown negro.

The general opinion is that the Ostrich is not polygamous. The number of eggs does not seem to be correctly ascertained. From 20 to 30, and 38 with 13 others scattered around the inartificial nest—a mere pit in the sand, which is thrown up so as to form an elevated edge round it, about three feet in diameter—have been found together. Some have made the number 80; others reduce it to 10. This is the number that Le Vaillant would assign to a single female, although he disturbed one from the nest containing the 38 eggs surrounded by the 13 others. This nest he watched, and saw during the day the four females successively sit upon them; and towards the close of the evening a male took his turn of incubation. This then was probably a common nest in which several females had laid their eggs. The passage in Job (xxxix. 14) will occur to every one, and there is no doubt that within the torrid zone the heat of the sun's rays renders the incubation of the female unnecessary, excepting perhaps at night; but in cooler latitudes she performs the maternal office with assiduity, and even in the warmer climates, where an officious determination to sit would in all probability endanger vitality of the eggs, she watches over them; and indeed the hunters have learned from her actions, and doubling back in her flight to one particular spot, where to seek for the nest. If, as has been asserted, the outlaying eggs are intended to serve for the nourishment of the young, it is a proof of provident care for her offspring on the part of the mother.

The flesh of the Ostrich when young is good and palatable, and the eggs are considered a great delicacy. Both Europeans and natives agree in this last opinion. The Hottentot, who abstracts the egg from the nest with a long stick, that the hen may not take alarm at the human touch, and not abandon the nest, but go on laying, as the common hen will do to a great extent when her nest is robbed, buries them in hot ashes. They are said to be excellent when eaten with a sufficient quantity of butter. The brains of hundreds of these birds not unfrequently made a dish at the insane Roman suppers; and Firmus is said to have eaten a whole ostrich at a meal. The flesh of the bird was prohibited by the Mosaical law as unclean, and the Arabs regard it in the same light; but many of the barbarous tribes in the interior of Africa feed on it without scruple. The well known plumes form a material article of commerce for the head-dress of European ladies, &c. There is in the noble and admirably arranged zoological gallery of the British Museum a fine and well-preserved series of young ostriches. Not the slightest trace of a nail is observable on the external toe of any of them, any more than on that of the adult bird. The usual height of the ostrich is from 7 to 8 feet, but it has reached 11 feet. The ostrich is a native of Africa and is scarcely known beyond the limits of the Arabian deserts.

(7928) *Casuarius* (Briss.)—Bill straight, carinated above, rounded and bent at the point; upper mandible slightly vaulted; the edges depressed, and notched or jagged towards the extremity; the lower mandible rather angular below towards the point; nasal fossæ nearly as long as the bill. Head helmeted. Front of the neck naked, and furnished with two wattles. Toes three. Wings entirely unfit for flight, furnished with five rounded naked pointed quills.

(7929) *Casuarius Emeu* has the bill compressed laterally, the head surmounted with a bony prominence covered with a horny substance; skin of the head and the upper part of the neck naked, tinged with cæruleau blue and flame colour, with pendent wattles like those of a turkey-cock; wings furnished with some stiff featherless quills; nail of the internal toe much the strongest. "It is," says Cuvier in continuation, "the largest of the birds after the ostrich, from which it differs sufficiently in its anatomy, for it has short intestines and small cæca, wants the intermediate stomach between the crop and the gizzard, and its cloaca does not exceed that of other birds in proportion. This well-known bird was named Emeu by the early Portuguese navigators. It is the *Emeu* vulgo *Casoaris* (the latter appearing to be the Malayan appellation of Bontius, the *Struthia Casuarius* of Linnæus, *Casuarius galeatus* of Vieillot, and Cassowary of the British naturalists, who now apply the term Emeu to the Australian Cassowary (*Dromaius*, Vieill.). Its height when erect is about 5 feet. It is a native of the peninsula of Malacca and the great chain of islands to the south and east. Bontius notes it from Ceram and the other neighbouring Molucca Islands. M. Lesson observes that it is very common in the islands of the Asiatic Archipelago, and especially at New Guinea. It is frequently seen alive in English menageries, and is common in museums. The species, which is characterised by M. Lesson as "stupid and massive," feeds on seeds and herbage according to him; but Cuvier says that it eats fruits and eggs, but no grain. Bontius states that he does not think it should be placed among the birds: "Alæ enim ad currendum pro velo, non ad volandum inserviunt." He adds, that when irritated, it does not rush forward to the attack, but turns itself obliquely, kicking backwards at the enemy. Cuvier observes that the featherless quills serve the bird for offensive weapons. Bontius remarks that the eggs are very different from those of the Ostrich, by reason of their thinness and colour, for their shell is greenish, ornamented with numerous tubercles of a deeper green (saturé viridibus): he adds that they are eaten by the natives. Cuvier relates that the bird lays a small number of green eggs, which it abandons, like the Ostrich, to the heat of the climate.—*Eng. Cyc.*

(7930) STRYCHNOS (from στρύχνος), a name applied by Theophrastus and Dioscorides to a kind of Nightshade, and adopted by Linnæus for a genus of Plants belonging to the natural order *Apocynaceæ*. This genus has been made the type of a distinct order by Blume, who has been followed by Link, D. Don, and others. The principal difference that it presents from the order *Apocynaceæ*, to which it is referred by Von Martius, Brown, and Lindley, is in its peltate seeds and simple succulent fruit. This genus is composed of trees or shrubs, which do not yield a milky juice, and have opposite usually nerved leaves and corymbose flowers. Some of the species are possessd of tendrils, and are climbing plants. The calyx is 5-parted; corolla tubular, funnel-shaped, with a 5-parted spreading limb, which is valvate in æstivation: the stamens are 5, inserted into the throat of the corolla; ovary 2-celled, with a single style and capitate stigma; fruit a berry, pulpy inside, with a hard rind; seeds peltate, numerous, attached to a central placenta, with copious albumen, and foliaceous embryo. The species are not numerous, and are found principally in the tropical parts of Asia and America. One has been described by Mr. Brown a native of Australia.—*Eng. Cyc.*

(7931) STRYCHNOS COLUBRINA. Malabar and Ceylon.

Modira canoram, Rheede. | Naga musada, Tel.

The wood (lignum colubrinum), Pao de Cobra. A climber with stem of great size, often from 8 to 12 inches in diameter, wood hard, intensely bitter, and of light grey colour. The wood of this plant is the true Pao de Cobra of the Portuguese. That of the root is deemed a powerful remedy for the bite of the cobra capella. Several woods have however received the appellation of *Bois de couleuvre*, (Lignum colubrinum) in different countries, viz. the Ophyoxylum serpentinum in Amboyna, the Ophiorhiza mungos in Java, Polygala senega in North America, &c. all for their supposed virtues as antidotes to snake poison. A very large proportionate quantity of strychnine exists in the wood of this root.—*O'Shaughnessy, page* 442.

Strychnos Colubrina, Snake-Wood, or Snake-Poison-Nut Tree, is a climbing plant with simple tendrils; leaves oblong or oval, obtuse, 3-nerved, shining; ovaries many-seeded. It is a native of the coast of Coromandel and of Silhet. It has small greenish-yellow flowers, and fruit as large as an orange, of a yellowish colour. It is called by the Telingas Naga Mussadi, and is considered by the Indian doctors as an effectual remedy for the bite of the Naga, or Cobra di Capella, the well-known poisonous snake; for this purpose it is used both externally and internally. It should however be stated as the result of the observation of the most intelligent travellers, that these vegetable remedies are not to be depended on in cases of bites of serpents, and that where danger is apprehended the only effectual remedy is excising the wound. The wood of this and other species of the genus is brought to Britain, and is known under the name *Lignum colubrinum.*—*Eng. Cyc.*

(7932) STRYCHNOS IGNATII, St. Ignatius's Bean, has ovate acute glabrous leaves; pyriform fruit with many seeds, and 4-flowered axillary peduncles. It is a climbing shrub, without tendrils, bearing long drooping white flowers, which have the scent of jasmine. This species is the *Ignatia amara* of Linnaeus, but has been referred to the present genus by later botanists. It is a native of Cochin-China, the Philippine Islands, and other parts of Asia. This plant is called Papeeta in India, and is used by the native doctors as a remedy in cholera, but is administered in conjunction with Jehiree (*Cocos Maldivica*). When given in over doses the symptoms are those of poisoning by strychnia, as vertigo, convulsions, &c. and the remedy used for these effects is lemonade in large quantities, which is said to afford relief speedily.—*Eng. Cyc.* See S. Sancto Ignati.

(7933) STRYCHNOS LIGUSTRINA. Cajualar, Caju-nassi, Cajubadaira pail or laut. Malayan archipelago. A tree resembling the orange tree; berries globose, yellowish green, two to eight seeded. This yields the *Lignum colubrinum* of Timor, used for the objects already described.—*O'Shaughnessy, page* 443.

(7934) STRYCHNOS NUX VOMICA.

Mooshtee, Tel.
Kachla, Hind.
Yettie cotay, Tam.
Musada, Tel.
Culaka, Cutaka, also Vesha-moosti beejum, Sans.
Moottee, Tam.
Kha Boung, Burm.
Koochila, Beng. Duk. Hind.
Koodaka dornatta, Cing.
Khanek ul Kalb, Arab.

A moderate sized tree, with a short crooked trunk. Branches irregular, the young ones long and flexuose, with smooth dark-grey bark. Wood white, close-grained, and bitter. Leaves opposite, with short petioles, oval, smooth, and shining, 3 to 5-nerved, differing in size. Flowers small, greenish-white, in terminal corymbs. Calyx 5-toothed. Corol funnel-shaped; limb 5-cleft, valvate. Stamens 5; filaments short, inserted over the bottom of the divisions of the calyx; anthers oblong, half exserted. Ovary 2-celled, with many ovules in each cell, attached to the thickened centre of the partition. Style equal to the corol in length. Stigma capitate. Berry round, smooth, about the size of an orange, covered with a smooth somewhat hard fragile shell, of a rich orange-colour when ripe, filled with a soft white gelatinous pulp, in which are immersed the seeds attached to a central placenta. Seeds peltate or shield-like, slightly hollowed on one side, convex on the other, about ¾ of an inch in diameter, and about two lines in thickness, thickly covered with silky ash-coloured hairs attached to a fibrous testa, which envelopes the kernel composed of horny bitter albumen, of the form of the seed and of the embryo imbedded in a hollow in its circumference.—Roxb. Corom. i. t. 4.—A native of the Indian Archipelago and of the forests of the Peninsula of India, as well as of the Southern parts of the Bengal Presidency, as near Midnapore.—Esenb and Eberm. 209. St. and Ch. 11. 52.—*Royle.*

All parts of the plant, except the pulp and flowers, are exceedingly bitter especially the wood of the root, and the inner layers of the bark.—*Roxb. Fl. Ind. i.* 475. The seed is inodorous, but its taste insupportably acrid and bitter. It is very difficult to reduce the seeds to powder; they must be first rasped, the raspings steeped in mucilage, then dried and powdered; or what is preferable, the rasping should be exposed to the steam of water for an hour, and then stove-dried, and powdered in a covered mortar. The *bark* is of an ash-grey colour while young, thin, compressed, inner surface black, outer surface of the larger pieces spotted with red rust-like patches. Fracture brittle, taste intensely bitter; nitric acid gives a blood-red stain to the black parts, and changes the red to a rich grass green. This bark is known to the European druggists under the name of the "*false angustura.*" Its nature was long suspected, but first clearly ascertained by Dr. O'Shaughnessy, (see the Journal of the Medical and Physical Society of Calcutta, Jan. 1837). The same bark is commonly sold in Calcutta, under the name of "*Rohun,*" and substituted for the harmless bark of the *Soymida febrifuga.—O' Shaughnessy, p.* 437.

Strychnos nux Nomica. Grows in the hilly parts of the Concans; where the nuts are used for poisoning fish.—*Riddell.* It is very common on the rocky sides of the hill at the back of Maulmain. The reputed property of the wood to cure the bite of venomous snakes, as stated by Lindley, is never heard of there, and is doubtless quite apocryphal.—*Mason.*

Strychnos nux-vomica is a very common tree throughout the Pegu Forests. The timber is strong and close-grained, but never of very large size. Wood, white colored, adapted for fancy work and cabinet making.—*McClelland.* Dr. Pereira thinks that the *Nux Mechil* of Serapion is Nux Vomica; but in Persian works this name is applied to a Datura. The wood of the Nux Vomica tree is said by Dr. Christison to be often substituted for the *Lignum Colubrinum,* or Snake-wood.—*Royle.* See NUX VOMICA.

(7935) STRYCHNOS POTATORUM. Lin.

Clearing nut, ENG.
Tettam cottay, TAM.
Chilbingeka phull, DUK.
Tsillaghenzaloo, TEL.
Chil binj, HIND.
Katake, SANS.

The Wood.

nduga wood. ENG.
nduga kurra, TEL.
Chilbeenj, kee lakree HIND.

The Tree.

Clearing nut tree ENG.
Chilla ginja, TEL.
aitan, TAM.
Chillbeeng or neermul or neermulee, HIND.
Induga or Titan cotta BENG.

A large tree found among the mountains of Bengal, flowers during the hot season, occurs in gardens in many parts of India. The wood is hard and durable, pulp when ripe eaten by the natives. The ripe seeds are sold in the bazars for clearing water. The entire plant is destitute of the poisonous ingredients of the other species. By rubbing the nuts round the inside of water-pots, the impurities very soon fall to the bottom. This effect is so generally known that the seeds are usually carried by travellers in India. The nature of the action has not been clearly ascertained. It probably depends on astringency in the fruit. Ainslie informs us that the ripe fruit is deemed emetic by the Tamools of Southern India, when given in powder to the quantity of about half a tea spoonful—*O' Shaughnessy, page* 443. On this point, Ainslie says, this fruit though, when very young, it is made into a preserve and eaten, is reckoned in its ripe state amongst the emetics of the Tamool Practitioners. The seeds are used for the purpose of clearing muddy water. One of them being usually rubbed hard for a short time round the inside of an earthern pot, the water is afterwards poured into it and left to settle: the impurities soon subsiding the water will be found clear and tasteless. The Canarese name of the tree is chittu.—*Ains. Mat. Med. p.* 119. Dr. Hooker found the *Strychnos potatorum,* forming a dense foliaged tree, 30 to 60 feet high, and while some individuals are a pale yellow, others are deep green, yet both in apparent health.—*Hooker Him. Jour. p.* 50.

Strychnos Potatorum, the Clearing-Nut, has ovate or oval glabrous pointed leaves; a deeply-fissured bark; and berries containing only one seed. It is an abundant plant in the woods and mountains of the East Indies. It has shining fruit, which is black when ripe. When full grown it attains a height of from 15 to 20 feet, and, has a very hard wood, which is used for various economical purposes. The English name is derived from the use which is made of the seeds, which, when dried, are sold by the natives for the purposes of clearing muddy water.—*Eng. Cyc.*

(7936) STRYCHNOS SANCTI IGNATII.

ST. IGNATIUS' BEAN. *Syn.* Ignatia amara.

Papeeta. HIND.

A branching tree, a native of the Philippine islands. The seeds are an inch long, (the size of a large olive.) According to the analysis of Pelletier and Caventou, these beans contain igasurate (strychnate) of strychnia, wax, concrete oil, yellow colouring matter, green starch, bassorine, and vegetable fibre. The strychnine is present in three times the quantity of that in the kuchila nuts, but there is no brucine. Its activity is consequently very great, its uses the same as those of nux vomica. Besides the symptoms therein described the papeeta nut purges in small doses, and is hence deemed, and we believe correctly, to be an efficacious vermifuge medicine.—*O'Shaughnessy, page* 441. See S. Ignatii.

(7937) STRYCHNOS TIEUTE. (Tshellik or Tjettik.) A native of Java, a large climbing shrub; an exceedingly violent poison, which acts exactly in the same manner as strychnine, is prepared from the bark of the root of this tree. The root is called Upas Radja, but does not belong to the true Upas tree of Java, which is the Antiaris toxicaria of the Mat. Med. Order Urticaceæ.—*O'Shaughnessy, page* 444.

The *Strychnos Tieute*, Tjettek, or Upas Tieute, has elliptical, acuminate, 3-nerved, glabrous leaves, and simple tendrils, which are thickened opposite the solitary leaves. This plant is a climbing shrub, and is a native of Java and is said to be the true Upas-Tree of that country. It is undoubtedly the most poisonous species of the genus, and yields the greatest quantity of strychnia. There are several other plants which are called by the name of Upas in various parts of Asia. The natives of Java prepare from this species one of the most deadly of the various poisons that are used by barbarous nations for producing death by the wounds occasioned by their arrows.—*Eng. Cyc.*

(7938) STRYCHNOS TOXIFERA. A native of Guiana, ascertained to be the basis of the celebrated Woorara poison.—*O'Shaughnessy, page* 443.

(7939) STUCCO. A compound of paris-plaster and lime, used in making cornices, &c.

(7940) STURIONIDÆ, a family of Fishes belonging to the section, *Chondropterygii*, the species of which are distinguished from others of the section by the gills being free, as in ordinary fishes, thus differing from the second great division of the fishes having a cartilaginous skeleton, such as the Sharks and Rays, in which the gills are fixed, and have their outer margin attached to the skin. The *Sturionidæ*, or Sturgeon Tribe, have moreover but one opening to the gills, and this is protected by an operculum. Four genera are contained in this family, *Accipenser*, *Spatularia*, *Chimæra*, and *Collorhynchus*. To the first of these genera belongs the common Sturgeon (*Accipenser Sturio*, Linn.), which is not unfrequently met with in mouths of English rivers. It is of an elongated form, and has the body protected by numerous indurated plates, which are arranged in a longitudinal series; the head is entirely covered by bony plates; the muzzle is elongated, and more or less pointed; and the mouth, which is placed on the under side of the head, is tubular, and destitute of teeth: on the back is a single dorsal fin, which is placed on the hinder third of the fish: the tail is forked, and the upper lobe is the largest, as in the Sharks.—*Eng. Cyc.*

(7941) STYLIDIUM (a diminution of 'stylus,' column), the name of a genus of Plants, of the type of the natural order *Stylideaceæ*. This is chiefly an Australian genus of plants, and is remarkable for its gynandrous structure, and for the irritability of the column formed by the union of filaments and style. The species of this genus described by Mr. Brown, in his 'Prodromus Floræ Novæ Hollandiæ,' are forty-five in number; besides these there are two or three natives of the East Indies.—*Eng. Cyc.*

(7942) STYLOCERUS RATNA. The Barking Deer, occurs at Siligoree, in the Terai.—*Hook. Him. Jour. p.* 399,

(7943) STURNIDÆ, Mr. Vigors' name for the Starling Family, belonging to his order *Insessores*. Linnæus placed his genus *Sturnus*, consisting of only five species, among which the Water-Ouzel appears as *Sturnus Cinclus*, between *Alauda* and *Turdus*, in his order *Passeres*. Cuvier arranges the Starlings between the Cassiques (*Cassicus*) and the Crows (*Corvus*).

(7944) STURNUS VULGARIS, the Common Starling, the Stare. This bird is well known in Great Britain as one of the handsomest of British birds, and is a general favourite. It is intelligent, sprightly, has a retentive memory, and, when kept in confinement, the males learn to whistle tunes and imitate some of the sounds of the human voice. They are social, living in flocks throughout the greater portion of the year. The Starling builds in church steeples, under eaves, and in holes of houses, towers, or ruins. The nest is made of slender twigs. The eggs are four or five in number, of a delicate pale blue, 1 inch 2 lines in length by 10 lines in breadth. Their food consists of worms, insects, and snails. They are frequently seen in meadows searching for food amongst cattle and sheep. They sometimes eat berries and grain. They occasionally congregate together in prodigious numbers in shrubberies and plantations. The Starling is common in almost every part of the United Kingdom. It is found in the north of Europe, and as far east as Nepaul, the Himalaya Mountains, Calcutta, China, and Japan. It has been seen in Africa as far south as the Cape of Good Hope.

(7945) *Pastor roseus*, the Rose-Coloured Ouzel. This bird is an accidental visitor in the British Islands. Like the Common Starling, it has a wide geographical range. It is very numerous in various parts of Hindustan. It inhabits Syria, Egypt, and Africa. It flies in flocks, and has many of the habits of the Common Starling. The adult male has a beak of a yellowish rose-colour; the head, neck, wings, and tail black, glossed with violet-blue; the feathers on the head elongated so as to form a flowing crest; the back, scapulars, and rump of a delicate rose-colour; the chin, throat, and front of the neck, black; breast, sides, and abdomen, like the back, of rose colour; thighs and under tail-coverts black; legs and toes yellowish-brown; claws darker brown. (Yarrell.)—*Eng. Cyc.*

(7946) STYRACEÆ, *Storaxworts*, a small natural order of Plants, placed by Lindley in his Polycarpous group of Monopetalous Exogens. The species are trees or shrubs, with alternate leaves without stipules, usually turning yellow in drying. The flowers are axillary, and are either solitary or clustered with membranaceous bracts. The calyx is persistant, and has five divisions frequently differing from the calyx and with imbricated æstivation; stamens varying in number, arising from the tube of the corolla, with 2-celled anthers; ovary 3-5-celled, with few ovules, a simple style, and capitate stigma; fruit a drupe; seeds solitary, with the embryo lying n the midst of albumen. This order is nearly allied to *Ericaceæ* from which it differs in habit, ts definite seeds, and its frequently inferior ovary. It differs from *Ebenaceæ* in its stamens being perigynous, in the insertion of the ovules, and its simple style. It is however an order on which there are many different opinions, some eferring all its genera to *Ebenaceæ*, whilst others eparate from it the genera *Symplocos* and *Halesia* as types of distinct orders. The species are found in the temperate and tropical parts of North and South America, and also in Nepaul and China. This order is chiefly remarkable, n an economical point of view, for furnishing he Storax and Benzoin of commerce, which contain a peculiar acid called the Benzoic Acid. Some of the species are used for dyeing yellow, nd a species of *Alstonia* is employed as a substitute for tea. The various species of *Halesia* re the Snow-Drop Trees of the Carolinas. —*Eng. Cyc.*

(7947) STYRAX, Linn. *Decand. Monog.* Calyx ather campanulate, nearly entire, or 5-toothed. Corolla campanulate at the base, deeply 3—7 cleft. Stamens 6—16, seldom 10, exserted; laments united to the tube of the corol, sometimes adhering at the base into a ring; anthers near, 2-celled, opening by internal longitudinal lits. Ovary inferior, Style simple. Stigma btuse, somewhat lobed. Drupe dry, splitting nperfectly into 2 or 3 valves, with 1—2—3 tones. Seed solitary, erect, with a large, leafy, hin embryo lying in the midst of fleshy albumen, with an inferior radicle (*Lindley.*)—Styrax fficinale and S. Benzoin yield officinal products. —*Royle.*

(7948) STYRAX BENZOIN, Benjamin, Stoax, or Gum-Benjamin Tree. Leaves ovate oblong, ointed, glabrous above, downy beneath; racemes compound, almost the length of the leaves. t is a native of Sumatra and Java. It is the lant which produces the Benzoin, or Gum Benjamin, of commerce; and which, as well as Storax, is used in medicine. [BENZOIN.] The great consumption however of these resins is not as medicines, but in their use as incense in the worship of the Roman Catholics and Mohammedans. Though older botanists, as Garcias, Grim, and others, were acquainted with the tree that yielded Benzoin, Ray confounded it with the genus *Laurus*, and Linnæus with the genera *Croton* and *Terminalia*. Dryander gave a correct account of the plant in 1787, and referred it to its present position.—*Eng. Cyc.*

(7949) STYRAX OFFICINALE. L. E. D. Balsamum, L. Resina, E. Balsamic exudation, E. of Styrax officinale, Linn. Officinal Storax. A small tree with smooth bark, and downy spots and petioles. Leaves ovate-obtuse, of a green colour, and shining above, white and downy on the under-surface, something like those of the Quince tree. Flowers white, in terminal racemes of a few flowers, which resemble those of the orange. Calyx downy (2), cup-shaped, 5 to 7 toothed. Corolla externally hairy, with 5 to 7 segments. Stamens (2) 10 to 16. Fruit about the size of a cherry, coriaceous, downy, with 1 or 2 nuclei. —A native of Asia Minor and Syria common in Greece, and cultivated in the south of Europe. As this plant does not yield a balsamic exudation in all these situations some Storax has been thought to be yielded by *Liquidambar orientale.* Du Hamel, however, states having seen it flow from a tree near the Chartreuse of Montriau.—Ehenb. and Eberm. 210. Fl. Græc. t 375. St. and Ch. 47. Storax (στυραξ) was well known to the Greeks. Dioscorides compares the tree producing it with the Quince tree. It is called *asteruk* in the East. Much of the Storax of commerce is yielded by this tree when incisions are made into it. The tree is common in Asia Minor where Professor Forbes was informed Storax was collected from it. Several kinds are known in commerce and described in books. (*v.* Pereira.) Of these, Storax in grains, Reed Storax (Storax calamita), called Storax amygdaloides by Guibourt, used to be most common. One kind of Liquid Storax is yielded in the islands of Cos and Rhodes by *Styrax officinale*, which is there called βουχουρι. This seems only the Arabic word *Bukhoor*, signifying incense or fumigation, put into Greek letters. Common Storax is in brown or reddish-brown masses, varying in shape (in turf-like cakes, *c.*), light and friable, but possessing some tenacity, softening when warmed. It has a fragrant balsamic odour, and a warm aromatic taste. It consists evidently of saw-dust united with some balsamic substance. Merat and De Lens inform us that a factitious compound is made both in the Levant and at Marseilles with the saw-dust of the wood and the juice of this tree, with a little Benzoin. The ancients also employed saw-dust, honey, wax, iris-root, &c. Storax, when exposed to air, becomes covered with an efflorescence of Benzoic Acid.

It burns with a white flame, leaving a carbonaceous residue ; gives a slight colour and odour to water ; but the greater part, with the exception of impurities, is dissolved by Rectified Spirit. Reinsch gives as the constituents of the Red Storax, a trace of Volatile Oil, Benzoic acid 1 to 2·6 per cent., Gum and Extractive 7-9 to 14, Resin 32·7 to 53·7, with much woody fibre. It hence requires to be purified.—*Royle. p* 471. *Storax*, then, Ustrouk Hind., occurs in three different forms—1. in grains ; 2. in soft masses ; 3. in brittle masses.

1. *Storax in grains*, the rarest and purest of all, in transparent, yellowish-white or reddish-yellow grains, the size of a small bean, the consistence of wax, and capable of consolidating into a thick mass. Odour strong, penetrating, and very agreeable. Taste aromatic and bitter.

2. *Storax in soft mass*, or amygdaloid storax (*Storax calamite*, Lemery), softer than the preceding species, easily fusible, with brown fracture, displaying almond-like yellowish tears. Odour very sweet, like benzoin, taste sweet and perfumed.

3. *Massive hard storax*. Light brown, yellow, reddish brown and friable, sometimes slightly tenacious, softens under the teeth. Odour less than that of two preceding varieties, and resembling balsam of Tolu ; flavour sweet. This variety is very impure, being usually adulterated with saw-dust, &c. The better kinds of storax burn with a white flame, and give a light, spongy, carbonaceous residue. It communicates to water a yellow colour and fragrant smell. It is soluble (except the impurities) in alcohol and ether. Storax is brought to Europe from Turkey in Asia ; formerly it was packed in bulrushes, at present it is sent in bladders. M. Fee deems the origin of this drug uncertain ; the styrax tree, cultivated in the south of Europe, affords no balsam, but this may be because the soil and climate differ from those of its native country. The strong resemblance between this product and the balsam copalm produced by the Liquidambar styraciflua, led to the idea that storax might probably be secreted by some congenerous tree, and Bernard de Jussieu pointed out the Liquidambar orientale, a tree common in Syria, as the most likely source of the article. It is now, however ascertained that storax is in reality produced by the Styrax officinale, a native of the Levant, Syria, Palestine, Greece, and the Peloponesus. Storax or styrax, (Greek στυραξ, Arabic *estorak*,) is a word of unknown origin.—*O'Shaughnessy page* 429-30.

(7950) SUÆDA. Of this genus Wight, in Icones, gives Suæda Indica, 1796 ; monoica, 1792.

(7951) SUÆDA INDICA.

Koyey Passeeray keeray, Tam.

A procumbent weed with pea green leaves, found in salt marshes, sometimes in gardens, used in native culinary as spinach.—*Jaffrey.*

(7952) SUBZEE or SUBJA. An intoxicating liquor prepared from hemp leaves ; black pepper cardamoms ; Poppy seed : cucumis utilissimus and sativus. It exhilirates without injurious consequences.—*Herktots.*

(7953) SUCCORY. Cichorium Intybus. Much used in France as a winter salad under the name of *Barbe du Capucine*. The common way to grow this plant is similar to carrots. When the tapering roots have attained some size, they are lifted, the leaves cut off, the roots are then planted in sand in a dark room or cellar ; where in consequence of the absence of light the roots throw out white leaves which make an excellent vegetable. This plant is the Cichory of commerce used in the adulteration of Coffee.—*Jaffrey.*

(7954) SUFURA KOOMRA. *Hind.* Sappara Koomrog, *Duk.* Cucurbitis Ovifera. Vegetable Marrow.

(7955) SUGAR.

Sukkur, Arab.	Shakur, Pers.
Suiker, Dut.	Acucar, Port.
Sucre, Fr.	Sachar, Rus.
Zucker, Ger.	Sarkara, Sans.
Shuckar, Guz Hind.	Azucar, Sp.
Zucchero, It.	Sakkara, Tam.
Goola Mal.	Panchadara, Tel.

The commercial Sugars of Asia are chiefly the products of the

Sugar-cane, Saccharum officinarum.
Do. do. do. sinense.
Date Sugar, Phœnix sylvestris.
Palmyra Sugar, Borassus flabelliformis.
Cocoanut Sugar, Cocos nucifera.
Ejoo or Gomuti Sugar, (Saguerus Rumphii, Arenga saccharifera.
Nepal Sugar, Nipa fruticans.

The great commercial importance of this product would require that it were treated in
large volume, and to keep an intelligible notice o
it within the scope of this work may be an impossible task.

Sugar exist in all vegetables having a swee taste, but is chiefly procured from boiling the expressed juice of the sugar cane, a plant which thrives from the equator to the 32° of latitude. In commerce, Sugar is met with in different degrees of purity, from *common brown*, t *double refined* and *crystalized* ; each quality being generally characterised by a distinctive appellation. Sugar of various quality, is largely manufactured in the Bengal, Madras, and Bombay Presidencies, from the Sugar-cane. A large quantity of the sugar made in India i exported to the Arabian and Persian Gulfs London, &c. China and Siam sugar is largely imported into Bombay, a good deal of which i re-exported to the above named ports.—*Faulkner*

History.—Coeval with the use of other vegetable products, for domestic purposes in India, appears to have been the employment of the juice of the sugarcane; though it would not seem that the ancients possessed any knowledge of the process by which this saccharine matter is converted into a crystallized substance. Every mention made of it, from the various passages in Scripture down to the commencement of the Christian era, is simply that of a "sweet cane," or of a "fine kind of honey found in an Indian reed." Nearchus, the admiral of Alexander the Great, was the first who made known the existence of the sugar-cane, in the western world; and from his time we find frequent allusion to this vegetable product, by Theophrastus, Varro, Dioscorides, and others. Herodotus alludes to "honey made by the hands of men;" but enters into no details. Lucan speaks of the sweet juice expressed from reeds, which the people of India were fond of drinking, and which Pliny calls "saccharine." Still later, Arrian, in his *Periplus of the Red Sea* alludes to the honey from reeds called sacchar, as an article of trade between the Indian ports and the countries of the Red Sea. The sugar-cane was found growing in the meadows about Tripoli in Syria; and mention is made by a writer of that day of eleven camels loaded with sugar being taken by the Crusaders. Marco Polo, who travelled in the East in the year 1250, found abundance of sugar produced in the province of Bengal; and from the almost universal growth of the cane in that presidency at the first occupation of the country by the British, there is good reason for believing that its culture had rapidly extended at a very early period. From the earliest European intercourse with India, sugar in a great variety of forms was met with in daily use. No Hindoo lives without it, either as sugar, in its natural state, or in cakes called "jaggery." Upon the first possession of Calcutta by the Company there was a flourishing export trade in sugar to the Indian coasts, some of the Eastern islands, and a few ports in Arabia and Persia, to the extent of about 1500 tons; whilst the local consumption of the article was enormous. The quality of this sugar was, however, very inferior; and about the year 1776 some attempts were made to introduce into India the Jamaica mode of growing the cane, and manufacturing the sugar; but at that time these efforts were not attended with any success. The culture of the cane was nevertheless greatly extended; and by the year 1792, when the British duties on tea were reduced, and a consequent increased demand for sugar arose, not only in England but in many parts of Europe, so as greatly to enhance its price, the Company made large shipments of the article home; although all endeavours to get it rated for duty on the same scale as that from the West Indies failed. The price realised in the English market for Company's sugars was at this time 88*s.* 6*d.*; but it rose gradually until it reached 156*s.* per hundred-weight: a figure which, in spite of discriminating duties and high freights, left to the importers a clear profit of eighty or ninety per cent. The first agitation against the slave-trade and slave-grown produce helped to bring East-India sugars into more favourable notice; and the result of this growing demand, met by increasing culture in Bengal, was, that from 100 or 200 tons shipped home in 1790, the imports into London from Bengal in 1805 and 1807 amounted to 5000 tons. The following were the exports of Bengal sugar to Great Britain between the years 1803 and 1810:

Years.	Cwts.	Value.	Years.	Cwts.	Value.
1803	27 608	£56 789	1807	105,755	199,873
1804	78,619	208,060	1808	48,499	88,016
1805	102,732	295,814	1809	33,617	68,750
1806	67,455	150,250	1810	43,236	101,040

From this time forward the sugar trade with British India steadily increased; the throwing open of the Indian ports to private ships; the final cession of the Company's trade; the reduction of the Imperial duties on Sugar, the produce of the British possessions in the East; the failure of all the West Indian plantations, aided by the growing demand for sugars of all kinds, were all causes that had a sensible influence in bringing this branch of commerce to a degree of importance which fifty years since, could not have been anticipated by the most sanguine. In 1844 the imports of Bengal and Madras sugars into the port of London alone, amounted to 31,000 tons: in 1845, to 44,000 tons, in 1851 to 80,294 tons, of which ⅔ were from Bengal and ⅓ from Madras. The general import of sugar from the East Indies was as follows.

	1849	1850	1851	1852	1853
	Cwt.	Cwt,	Cwt.	Cwt.	Cwt.
Refined,............	56,074	12,474	31,407	2,562	15,464
Unrefined,............	1,471,139	1,362,837	1,574,473	1,302,159	1,225,273
Total, ...	1,527,213	1,375,311	1,605,884	1,304,721	1,240,737

Capper's Three Presidencies.

In addition to the Sugar-cane, however, as was noticed at the commencement of this article, this product is now obtained from several other sources, which will be noticed as we proceed. Of the palm tribe, as producing Sugar, it may be here mentioned that the fermented toddy from the Gomuti palm, the *Arenga saccharifera*, is boiled to a syrup, and thrown to cool in small vessels, the form of which it takes, and in this shape it is sold in the markets.

Upwards of four thousand years ago, the Hindoos knew how to make sugar from the flowers of the Madhuca (*Bassia latifolia*, Roxb.) but there is reason to suppose that sugar was made from some of the palms, at a much earlier period. At Jaffna in Ceylon, the sweet unfermented toddy, of several palms, is boiled until it becomes a thick syrup, when a small quantity of scraped cocoanut is thrown in, to ascertain, by the feel, whether the syrup has attained the proper consistency: if that be the case, it is poured into small baskets of palmyra leaf, in which it cools and hardens into jaggery. In the year ending 5th January 1850, Ceylon exported 9,580 cwts., of jaggery, bearing a customs value of £1,937, fully two thirds of which consisted of the produce of the palmyra. To make *Vellum*, or crystallised jaggery, the syrup is not boiled for so long a time, the pot which contains it, is covered, and put aside for some months, at the end of which period the crystals are found in abundance. The juice of the palmyra possesses a greater quantity of saccharine matter than most of the other palms; about three quarts of it suffice for boiling into one pound of jaggery. The chief fault of the jaggery made at Jaffna, seems to arise from the excessive application of lime, a small quantity of which is of course absolutely necessary to prevent fermentation. It is said that sugar which is chiefly the produce of the jaggery, is more granulated and higher prized than that obtained from the sugar-cane. Large quantities are imported into Europe or Cuddalore and Madras. The Export of Sugar from Ceylon for Madras is about nine thousand tons annually and a considerable portion of that is supposed to be the produce of the Palmyra.

Cocoanut tree.—In Ceylon when the toddy of the cocoanut tree is to be converted into sugar, particular care is taken to employ only clean and well dried vessels, which are regularly changed. Eight gallons of sweet toddy, boiled over a slow fire, yield two gallons of a very luscious fluid, called Penni, or honey, or Jaggery, or sugar water; which quantity being again boiled, yields a kind of coarse brown sugar, known as jaggery, which is formed into round cakes. When prepared for domestic purposes, each cake is separately tied up in pieces of dried banana leaves and suspended in a smoky place.

Phœnix dactylifera. Sugar.—Every twelve pints of its toddy boils down to one of *Jaggery* or *goor*, and four pounds of jaggery yield one of good brown sugar, so that the average produce of each tree is about seven or eight pounds of sugar annually. In the whole province of Bengal, about 15,000 maunds or 1,000,000 hundredweight of sugar is manufactured from this Date tree annually, but it sells at about one-fourth the price of that of Sugar cane.

The sugar made from the juice of the Kittul tree, the *Caryota urens*, is considered to possess more saccharine properties than that produced from the cocoanut tree.—*Capper.*

Sugar is obtained from many grasses. It is procured in Italy from *Sorghum saccharatum*; in China, from *Saccharum sinense*; in Brazil, from *Gynerium saccharoides*; in the West Indies, from *saccharum violaceum*; and in many other parts of the world from *S. officinarum*. The last two are commonly known as sugar canes, and they are generally considered as varieties of a single species of the *S. officinarum*, which is now widely spread over different parts of the world. Some curious specimens of palm sugars were exhibited at the Great Exhibition of 1851, among others,—gomuti palm sugar *(Arenga saccharifera)* from Java; date palm sugar, from the Deccan; Nipa sugar, from the stems of *Nipa fruticans*, as also from the *Bassia latifolia*,—an East Indian tree. Among the other sugars shown were beet-root sugar, maple sugar, date sugar, from Dacca, sugar from the butter tree (*Bassia butyracea*), produced in the division of Rohelkund; sugar candy, crystallized by the natives of Calcutta and other parts of India. Sugar and molasses from the grape, were also shown from Spain, Tunis and the Zollverein. An experienced sugar-dealer easily judges of the value of sugar by the taste, smell, specific gravity, moisture and general appearance. The value of molasses may be determined by drying at 220 degs., and by the taste.

The commercial demand for sugar is nevertheless mainly supplied from the juice of the cane, which contains it in greater quantity and purity than any other plant, and offers the greatest facilities for its extraction. Although sugar, identical in its character, exists in the maple, maize, the beet-root, and mango, and is economically obtained from these to a considerable extent, yet it is not sufficiently pure to admit of ready separation from the foreign matter combined with it, at least by the simple mechanical means which the ordinary producers usually have at command; unless carried on to a large extent, and with suitable machinery and chemical knowledge and appliances. The different species of commercial sugar usually met with in England are four, viz:—brown, or muscovado sugar (commonly called moist sugar); clayed sugar; refined or loaf sugar, and sugar candy; these varieties are altogether dependent on the difference in the methods employed in their manufacture.

The cultivation of the sugar cane, and the manufacture of sugar, were introduced into Europe from the East, by the Saracens, soon after their conquests, in the ninth century.

The common sugar cane is a perennial plant, very sensitive to cold, and is, therefore, restricted in its cultivation to regions bordering on the tropics, where there is little or no frost. In the Eastern hemisphere its production is principally confined to situations favorable to its growth, lying between the fortieth parallel of north latitude and a corresponding degree south. The cultivation of this plant is principally confined to the West Indies, Venezuela, Brazil, Mauritius, British India, China, Japan, the Sunda, Philippine, and Sandwich Islands, and to the southern districts of the United States. The varieties most cultivated in the latter are the striped blue and yellow ribbon, or Java, the red ribbon, violet, from Java, the Creole, crystalline or Malabar, the Otaheite, the purple, the yellow, the purple-banded, and the grey canes. The quantity of sugar produced on an acre varies from five hundred to three thousand pounds, averaging, perhaps, from eight hundred to one thousand pounds.

Six to eight pounds of the saccharine juice of the plant, yield one pound of raw sugar; from 16 to 20 cartloads of canes, ought to make a hogshead of sugar, if thoroughly ripe. The weight necessary to manufacture 10,000 hhds. of sugar, is usually estimated at 250,000 tons, or 25 tons per hhd. of 15 or 16 cwt.

Years.	British Plantation. Tons.	East India & Mauritius Tons.	Total of B. P. E. I. and Mauritius.	Consumption. Tons.
1838–39	176,033	54,017	230,050	195,483
39–40	141,219	60,358	201,577	191,279
40–41	110,739	52,232	162,971	179,741
41–42	107,560	97,792	205,352	202,971
42–43	123,685	80,429	204,114	199,491
43–44	125,178	78,943	204,121	202,259
44–45	122,639	81,959	204,598	206,999
45–46	142,384	102,690	245,074	244,030
47–48	164,646	125,829	290,475	289,537
48–49	139,868	107,844	247,712	308,131
49–50	142,203	121,850	264,053	296,119
50–51	129,471	119,317	248,788	305,616
51–52	148,000	110,000	258,000	312,778

The above figures refer to raw sugar only. At these periods, calculating from 1838-39, the duty on British sugar ranged from 24s. down to 10s. per cwt., and foreign slave-grown sugar from 63s. down to 14s. The greatest impetus was given to foreign sugar, when the duties were reduced, in 1846.

The average annual quantity of cane sugar produced and sent into the markets of the civilised world, at the present time, may be taken at 1,500,000 tons, exclusive of the amount grown and manufactured for local consumption in India, China, Cochin-China, and the Malay Archipelago, of which no certain statistics exist, but which has been estimated at about another million tons. So far back as 1844, the Calcutta "Star," in an article on sugar, estimated the domestic consumption in India, at 500,000 tons. This may be considerably below the mark, even if India is taken in its limited signification, as including only British subjects. On this estimate the 94,000,000 of British subjects, men, women and children, would not individually consume more than one pound avoirdupois by the month. A Brahmin, at any of the festivals given by the great, will digest for his own share a large quantity without at all embarrassing his stomach.

Assuming the million and a half of tons that find their way into civilized markets, to represent an average value at the place of production of £15 per ton, we have here the representation of £22,500,000 sterling. But this value may fairly be increased by one-fourth. The whole exportable production of the sugar-growing countries was found to be, in 1844, about 780,000 tons, of which Cuba furnished 200,000 tons. In 1845, notwithstanding Cuba only produced 80,000 tons, the increase from others sources was so considerable namely:—the British Colonial supply 40,000, United States 40,000, Porto Rico 15,000, Brazil 10,000 tons that the total produce fell very little short of the previous year—having reached 764,000 tons. The present supply of sugar to the markets of Europe, is nearly as follows:—

	Cwts.
England,…………………	8,000,000
France………………………	2,550,000
German League…………	1,350,000
Prussia,…………………	220,000
Austria (ten Provinces)….	560,000
Belgium……………… …	294,000

The whole annual production of the world is estimated by another party at 1,471,000,000 lbs., of which the United States produced 150,000,000 lbs., including 40,000,000 lbs. of maple sugar. Of the whole amount of sugar produced, Europe consumes about 648,700 tons, divided nearly as follows:—

	lbs.
Great Britain…………	803,360,096
France………… ……	160,080,000
Belgium………………	19,840,000
Netherlands…………	42,000,000
Russia…………………	70,000,000
Denmark and Sweden…	22,000,000
German Zollverein……	101,300,000
Other parts of Germany	160,000,000
Austria………………	50,000,000
	4,428,580,096

The consumption of sugar then in the whole world may be roughly estimated at two and a half million tons, of which the United Kingdom may now be put down for 350,000; the rest of Europe 420,000, and the United States 300,000.

The production of sugar in the last four years may be stated comparatively as follows :—

Cane Sugar.	1849	1850	1851.	1852.
	Tons.	Tons.	Tons.	Tons.
Cuba..................	220,000	250,000	252,000	320,000
Porto Rico...........	43,600	48,200	49,500	50,000
Brazil	106,000	103,000	113.000	100,000
United States.........	98,200	120,400	103,200	110,000
The West Indies.				
1 French Colonies.	56,300	47,200	50,000	50,000
2· Danish ... Do....	7,900	5,000	6,000	5,000
3. Dutch ... Do ...	13,800	14.200	15,000	20 000
4. British ... Do....	142,200	129,200	148 000	140,000
The East Indies......	70.403	67,300	66,000	60,000
Mauritius.	50.782	57,800	55,500	65,000
Java	90,000	89,900	99 347	104,542
Manilla................	20,000	20,000	20,000	20,000
	919,182	952,200	977,547	1,014,542

Beet root Sugar.	1849.	1850.	1851.	1852.
	Tons	Tons.	Tons.	Estmd. T.
France	38,000	61.000	75,000	60,000
Belgium	5 000	6,000	8,000	9,000
Zollverein,..	33,000	38,000	49,000	50,000
Russia	13,000	14 000	15,000	16,000
Austria...............	6,500	10,000	15,000	18,000
	95,500	129,000	162,000	153,000
Cane Sugar...........	919,182	952,200	977,547	1,014,542
Total...	1,014,682	1,081,200	1,139,547	1,197,542

Mauritius.—In the year 1813, the exports of sugar from this island were but 549,465 lbs., and increasing gradually to 128,476,547 lbs. in 1849, or two-hundred fold in thirty-six years. The equalisation of the duties in 1825, and the admission of Mauritius sugars into England on the same footing as those from the West Indies, had the effect of stimulating the sugar trade of Mauritius, and advancing it to its present remarkable success. Notwithstanding its immense crops, scarcely more than three-fifths of the island is yet under cultivation ; but it has the advantage of a cheap and abundant supply of labor, and much improved machinery has been introduced. The planters first commenced introducing Coolies in 1835, and were for some time restricted to the single port of Calcutta for their supply. The recent advices from Mauritius furnish some interesting information regarding the progress making in the sugar production of that colony. In reference to the cultivation of the cane, it is stated that by the introduction of guano upon several estates in the interior, the production has been very largely increased ; but as the value and economy of manure has not been hitherto sufficiently estimated, its introduction has not been so general as could be desired. The importance of free labor to the cultivation of the estates, has now become fully appreciated by the planters ; it being found that an equal amount of work can be obtained by this means from a less number of hands, and that at lower rates of wages than were current in previous years, the average of which is shown in the following table :—

Years.	Number of Coolies employed.	Aggregate amount of wages paid per week.	Average wages per head per week.	
		£	s.	d.
1846	47,733	33.484	14	0
1847	48,314	35,338	14	9
1848	41 777	26,627	12	9
1849	45,384	27 625	12	2
1850	47,912	31,664	12	3
1851	42,275	27,832	12	2

In 1826, to make from 25 to 30,000,000 lbs. of sugar, it required 30,000 laborers (slaves) ; at the present time, with less than 45,000 (from which number fully 5,000 must be deducted as absent from work from various causes), 135,000,000 lbs. are produced, or about five times the quantity under slavery. The coolies are found to be an intelligent race, who have become inured to the work required, and by whose labor this small island can produce the fifth part of the consumption of the United Kingdom, and that with only about 70,000 acres under cane cultivation. About 10,000 male immigrants, introduced since 1843, are not now working under engagement, but are following other occupations, and thus become permanent consumers. Some cultivate land on a small scale, on their own account, but very few plant canes, as it requires from eighteen to twenty months before they obtain any return for their labor ; but the most important fact established by this and other official statements is, that only a small number of immigrants leave the colony at the expiration of their industrial residence. In the manufacture of sugar from the cane, considerable improvement has been effected by the introduction of new methods of boiling and grinding. The vacuum pan and the system of Wetsell are all tending to economise the cost of production, and to save that loss which for years amounted, in grinding alone, to nearly one-third of the juice of the cane. The planters begin to find that they can increase the value of their sugar 30 to 40 per cent. by these improvements, and that their future prosperity depends upon carrying them out. Unfortunately, however, here, as in many other of our colonies, a very large number of planters do not yet appreciate the advantages to be obtained by the adoption of improved machinery and manufacture, or by improved cultivation, and still struggle on under the old system of waste and negligence, which can only result in the ruin and destruction of their property. In 1827, the number of sugar estates in operation in Mauritius, were 49 worked by water power, 50 by cattle or horses, and 22 by steam--total 111; in 1836, this number had increased to 186, viz.—64 moved by water power, 10 by horse, and 112 by steam. In 1839, the number was 211, of which 138 were worked by steam power—70,292 acres were then under cultivation with sugar. There are now about 490 sugar estates, whereof only 231 have mills—42 are worked by water power, the rest by steam. The annual Mauritius crops, as exported, for the last ten years, have been as follows. The shipments frequently extend beyond a year, hence a discrepancy sometimes between the year's crop and the year's export:—

1842-43 ……	24,400	1847-48 ……	59,021
1843-44 ……	28,600	1848-49 ……	50,782
1844-45 ……	37,600	1849-50 ……	51,811
1845-46 ……	49,100	1850-51 ….	55,000
1846-47 ……	64,100	1851-52 ……	65,800

Besides its exports to Great Britain, Mauritius ships large quantities of sugar to the Cape of Good Hope and Australia. Its local consumption is moreover put down at about 2,500 tons. The progressive increase in its exports is marked by the following return of imports into Great Britain from the island:—

	cwt.		cwt.
1826 ……..	93.723	1839 …….	604,671
1827 ……..	186,782	1840 …….	690,294
1828 ……..	204,344	1841 …….	545 356
1829 ……..	361,325	1842 …….	716,009
1830 ……..	297,958	1843 …….	696,652
1831 ….. ..	485,710	1844 …….	545,415
1832 ……..	517 553	1845 …….	716,173
1833 ……..	521 904	1846 …….	845,197
1834 ……..	516,077	1847 …….	1,193,571
1835 ……..	553,891	1848 …. ..	886,184
1836 ……..	558,237	1849 …….	893,524
1837 ……..	497,302	1850 …….	1 003,296
1838 ……..	537,455	1851 …….	999,337

Java.—Attention has been withdrawn, in a great measure, from sugar cultivation in Java, owing to coffee being found a more remunerative staple. The following figures serve to show the extent of its exports of sugar:—

	cwt.		cwt.
1826 …….	23,565	1838 ……..	873 056
1827 …. ..	38.357	1839 ……..	999,895
1828 . …..	31,301	1840 ……..	1,231,135
1829 …….	91.227	1841 ……..	1,252,041
1830 ……	129.300	1842 …. …	1,105,856
1831 …….	144.077	1843 ……..	1,162,211
1832 …….	292.705	1844 ……..	1.260,790
1833 …. ..	151 128	1845 ……..	1 812,500
1834	413,911	1848 ……..	1,798,612
1835 …….	523,162	1850 ……..	1,797,874
1836 …….	607,336	1851 ……..	1,987 957
1837 …. ..	820,063	1852 . …..	2,090,845

In 1840 England imported from Java 75,533 cwt.: in 1841, 87,342 cwt.; in 1842, 24,922 cwt.; in 1843, 35,161 cwt.; and in 1844, about 72,000 cwt.; but most of this was only sent to Cowes, for orders, to be transhipped to the Continent.

Philippines.—The Exports from Manila into Great Britain in 1841, were 133,482 cwt.: in

1842, 63,464 cwt.; and in 1843, 48,977 cwt. In the fifteen years between 1835 and 1850, the export of sugar from the Philippine Islands more than doubled:—

	Tons.		Tons.
1835 …. ….	11,542	1841 ……..	15 321
1836 ……. ..	14.875	1842 ……..	18,540
1837 ……..	12 293	1843 ……..	22 239
1838 ……..	12,375	1844 ……..	21,528
1839 ……..	15,631	1845 ……..	24,500
1840 . …….	16,563	1850 ……..	28,745

About a third of this is raw sugar, the rest is clayed or refined. It is singular, that though these islands belong to Spain, the export of this staple product to that country should be limited to about 600 tons; America taking about one-sixth, and England and her colonies the remainder. There is now an increased demand for the Australian colonies, consequent upon the large influx of population to that quarter.

Export of sugar from Manila in 1850.

	Piculs.
To Great Britain……………………………	146,926
„ Continent of Europe………………………	50,830
„ Australian Colonies………………………	142,359
„ Singapore, Batavia, and Bombay………	12,749
„ California and the Pacific………………	29 144
„ The United States…………………………	77,919
	459,927

Sugar cane.—The sugar cane occurs in a wild state on many of the islands of the Pacific, but in no part of the American continent, notwithstanding a contrary opinion has been expressed.

The following are the chief varieties cultivated in the West Indies, Louisiana, the East Indies, and Mauritius:—

1. Common or creole cane, so called from being introduced from the New World.
2. Yellow Bourbon.
3. Yellow Otaheite.
4. Otaheite with purple bands.
5. Purple Otaheite.
6. Ribbon cane.

Mr. L. Wray, in his "Practical Sugar Planter," considers the Bourbon, and yellow, or straw-coloured Otaheite cane, as identical, but merely altered by change of soil and climate. The yield from these cane-plants seems to be about the same in either Indies, viz., in good land about two-and-a half tons of dry sugar per acre—sometimes three tons.

A very large species of red cane, grown at Gowhatty, in Assam, is made favorable mention of for its strength of growth, early maturity, and juiciness; and Mr. Wray strongly recommends the introduction into the West Indies of another fine variety, generally grown in the Straits' Settlements, where it is known by the name of the Salangore cane. He considers they would ratoon better than any other cane, and the return from it is on the average 3,600 lbs. of dry sugar to the acre.

"For my own part, he says, I have always reckoned as an average, 3,600 lbs. of dry sugar to the acre as the return this cane will give, on anything like good land, in the Straits, according to the present imperfect mode of expressing and manufacture; but, considering the surpassing richness of land in the West India Islands, Demerara, and Mauritius, I should not be in any way surprised to find that it would there give even three tons an acre. The Salangore cane grows firm and stong; stands upright much better than the Otaheite; gives juice most abundantly, which is sweet and easy of clarification, boils well, and produces a very fine, fair sugar, of a bold and sparkling grain."

Much discussion has arisen on the subject of raising the sugar cane from seed, and the possibility has been universally denied among the planters and agricultural societies of the West India colonies. Mr. Pritchard, a sugar planter of Louisiana. in the "United States Patent Report for 1850," however, states:—"It is an error to suppose that the cane cannot be propagated from the seed. This may be the case when the seed is obtained from plants that have been produced for a number of years from buds, or eyes. All plants that have been produced in this way for a series of years, lose the faculty of forming prolific seeds; and the sugar cane is governed by the same laws which govern the whole vegetable kingdom. It cannot, therefore, be expected to produce seeds after it has been cultivated for a great length of time."

India.—Sugar is a very old and extensive cultivation in India. It would propably be within the mark, to estimate the annual produce of the country at a million of tons. An official return showed that the quantity of sugar carried on one road of the interior, for provincial consumption, was about equal to the whole quantity shipped from Calcutta—some 50,000 or 60,000 tons. India is fast becoming a great sugar producing country, although its produce and processes of manufacture are rude and imperfect. The Coolies who return from time to time to the India ports, bring with them much acquired knowledge and experience from the Mauritius. In 1825, the import of sugar from the East Indies was but 146,000 cwt, and it fluctuated greatly in succeeding years, being occasionally as low as 76,600 cwt. In 1837 the quantity imported was just double what it was in 1827. In 1841, it had reached as high as 1,239,738 cwt., and subsequently kept steady for a few years at 1,100,000 cwt.—and for the last four years ending 1851, has averaged 1,400,000 cwt.

Some years since, (*Report*, 18*th December*, 1822) the East India Company instituted inquiries relative to the cultivation of the sugar cane in Hindostan, and the information obtained was published in a large folio volume. The Reports furnished by their officers, from almost every district, concur in stating that there were three kinds cultivated:—1, The purple. 2. The white. 3. A variety of the white, requiring a large supply of water. The epitome of the Reports affords this information:—

1. *The purple coloured cane* yields a sweeter, richer juice, than the yellow or light coloured, but in less quantity, and is harder to press. Grows on dry lands. Scarce any other sort in Beerbhoom, much in Radnagore, some about Santipore, mixed with light colored cane. Grows also near Calcutta; in some fields separate, in others mixed with pooree or light colored cane. When eaten raw, is more dry and pithy in the mouth, but esteemed better sugar than the pooree, and appears to be the superior sort of cane. Persons who have been West Indian planters do not know it as a West Indian cane.

2. *The light colored cane*, yellow, inclining to white; deeper yellow when ripe, and on rich ground, it is the same sort as that which grows in the West India Islands; softer, more juicy than the Cadjoolee, but juice less rich, and produces sugar less strong; requires seven maunds of pooree juice to make as much goor or inspissated juice as is produced from six of the Cadjoolee. Much of this kind is brought to the Calcutta markets, and eaten raw.

3. *The white variety*, which grows in swampy lands, is light colored, and grows to a great height. Its juice is more watery, and yields a weaker sugar than the Cadjoolee. However, as much of Bengal consists of low grounds, and as the upland canes are liable to suffer from drought it may be advisable to encourage the cultivation of it, should the sugar it produces be approved, though in a less degree than other sugars, in order to guard against the effects of dry seasons. Experience alone can determine how far the idea of encouraging this sort may answer. Besides the foregoing, several kinds are now known to the Indian planter. One of them, the China sugar cane, was considered by Dr. Roxburgh to be a distinct species, and distinguished by him as *Saccharum sinense*. It was introduced into India in 1796, by Earl Cornwallis, as being superior to the native kinds. It is characterised by a hardness which effectually resists most of the country rude mills; but this hardness is importantly beneficial, inasmuch as that it withstands the attack of the white ants, hogs, and jackals, which destroy annually a large portion of the common cane. *Reports of Dr. Roxburgh, Mr. Touchet of Radanagore. and Mr. Cardia of Mirsapore, Culna, Papers on the India Sugar, page* 258.

Mysore.—Dr. Buchanan found four kinds known in Mysore. Two of these are evidently the purple and white generally known; but as this is not distinctly stated, Mr. Simmond has retained the form in which he notices them. *Restali*, the native sugar of the Mysore, could only be planted in the last two weeks of March and two first of April. It completes its growth in twelve months, and does not survive for a second crop. Its cultivation has been superseded by others.

Puttaputti.—This was introduced from Arcot, during the reign of Hyder Ali. It is the only one from which the natives can extract sugar; it also produces the best *Bella* or *Jaggery*. It can be planted at the same season as the other, as well as at the end of July and beginning of August. It is fourteen months in completing its growth; but the stools produce a second crop, like the ratoons of the West Indies, which ripen in twelve months.

Maracabo, Cuttaycabo.—These two are very small, seldom exceeding half an inch diameter; yet in some districts of Mysore, as about Colar, the last-named is the variety usually cultivated; but this arises from its requiring less water than the larger varieties. The best varieties are those introduced from the Islands of Otaheite and Bourbon. Hindostan is indebted for their introduction to Captain Sleeman, who brought them hither from the Mauritius in 1827. He committed them to Dr. Wallich, under whose care, at the Botanic Garden, they have flourished, and been the source from whence the benefit has been generally diffused. Their superiority over those which have been usually cultivated by the natives has been completely established. The largest of the Hindoostan canes, ripe and trimmed ready for the mill, has never been found to exceed five pounds; but it is not uncommon for an Otaheite cane, under similar circumstances, to weigh seven pounds. [Many are of opinion, that although the juice of this cane is larger in quantity, yet that it contains less sugar. There is some sense in the reason they assign, which is, that in the Mauritius and elsewhere it has the full time of twelve or fourteen months allowed for its coming to maturity—whereas the agriculture of India and especially in Bengal, only allows it eight or nine months, which, though ample to mature the smaller country canes, is not sufficient for the Otaheite.] The extra weight arises proportionately from an increased secretion of superior sap. The sugar is more abundant, granulates more readily, and has less scum. Other superior qualities are, that the canes ripen earlier, and are less injured by the occurrence of protracted dry weather. Of the history of the sugar cane a popular tradition obtains amongst the natives, that, in very ancient times, a vessel belonging to their country chanced by accident to leave one of her crew, under a desperate fit of sickness at a desert island at a considerable distance in the Eastern Seas, and that, returning by the same route, curiosity prompted them to inquire after the fate of their companion, when, to their utter astonishment, the man presented himself to their view, completely recovered from his sickness, and even in a state of more than common health. With anxiety they inquired for the physic he had so successfully applied, and were conducted by him to the sugar cane, on which he acquainted them he had solely subsisted from the time of their departure. Attracted by such powerful recommendation, every care and attention was bestowed, we may suppose, to convey such an invaluable acquisition to their own lands, where the soil and climate have mutually since contributed to its present prosperity.

Soil.—The soil best suiting the sugar cane is aluminous rather than the contrary, tenacious without being heavy, readily allowing excessive moisture to drain away, yet not light. One gentleman, Mr. Ballard, has endeavoured to make this point clear by describing the most favorable soils about Gazepore as "*light clays*," called there *Mootearee*, or *doansa* according as there is more or less sand in their composition.—*Trans. Agri-Hort. Soc.* i. 121. Mr. Peddington seems to think that calcareous matter, and iron in the state of *peroxide*, are essential to be present in a soil for the production of the superior sugar cane. There can be no doubt that the calcareous matter is necessary, but experience is opposed to his opinion relative to the peroxide. The soil preferred at Radnagore is there distinguished as the soil of "two qualities," being a mixture of rich clay and sand, and which Mr. Touchet believed to be known in England as a light brick mould. About Rungpore, Dinajpore, and other places where the ground is low, they raise the beds where the cane is to be planted four or five feet above the land adjacent. The experience of Dr. Roxburgh agrees with the preceding statements. He says, "The soil that suits the cane best in this climate is a rich vegetable earth, which on exposure to the air readily crumbles down into very fine mould. It is also necessary for it to be of such a level as allows of its being watered from the river by simply damming it up (which almost the whole of the land adjoining to this river, the Godavery, admits of), and yet so high as to be easily drained during heavy rains. Such a soil, and in such a situation, having been well meliorated by various crops of leguminous plants, or following, for two or three years, is slightly manured, or has had for some time cattle pent upon it. A favourite manure for the cane with the Hindoo farmer is the rotten straw of green and black pessaloo (*Phaseolus mungo, max.*)" Roxburgh on the Culture of Sugar and Jaggary in the Rajahmundry Circar; Third Ap. to Report on East India Sugar, p. 2. Many accordant opinions might be added to the preceding, but it seems only necessary to observe further that the sugar cane requires a soil sufficiently elevated to be entirely free from inundation, but not so high as to be deprived of moisture, or as to encourage the production of white ants (*termes*). The sugar cane is an exhausting crop, and it is seldom cultivated by the ryot more frequently than once in three or four years on the same land. During the intermediate period, such plants are grown as are found to improve the soil, of which, says Dr. Tennant, the Indian farmer is a perfect judge. They find the leguminous tribe the best for the purpose. Such long intervals of repose from the cane would not be requisite if a better system of manuring were adopted.

Mr J. Prinsep has recorded the following analysis of three soils distinguished for producing sugar. They were all a soft, fine-grained alluvium, without pebbles. No. 1 was from a village called Mothe, on the Sarjee, about ten miles north of the Ganges, at Buxar, and the others from the south bank of the Ganges, near the same place. There is a substratum of *kunkar* throughout the whole of that part of the country, and to some mixture of this earth with the surface soil the fertility of the latter is ascribed :—

	1	2	3
Hygrometric moisture, on drying at 212 deg.	2 5	2·1	3·6
Carbonaceous and vegetable matter, on calciuation....	1·8	2·1	4·0
Carbonate of lime (No. 3 effervesced.)	1·6	0·6	3·9
Alkaline salt, soluble.	1 0	1·1	0·3
Silex and alumina.	94·1	94.1	88·2
	100·0	100·0	100.0

The earths unfortunately were not separated. Mr. Prinsep says the two first were chiefly of sand, and the third somewhat argillaceous. The former required irrigation, but the other was sufficiently retentive of moisture to render it unnecessary.—(Journ. Asiatic Soc., ii. 435.)

Manures.—The sugar cane being one of the most valued crops of the ryot, he always devotes to it a portion of the fertilising matter he has at command, though in every instance this is too small. In the Rajahmundry district, previously to planting, the soil is slightly manured, either by having cattle folded upon it, or by a light covering of the rotten straw of the green and black pessalloo, which is here a favourite fertiliser. In some parts of Mysore the mud from the bottom of tanks is employed, and this practice is more generally adopted in other places. Thus the fields being divided by deep ditches in Dinajpoor, the mud from which is enriched by the remains of decayed aquatic plants and animals, forms an excellent manure for the sugar cane, and of this the ryots make use, spreading it over the surface before the ploughing is commenced ; and when that operation is completed, the soil is further fertilised by a dressing of oilcake and ashes. Crushed bones would unquestionably be of the greatest benefit if applied to the sugar cane crop. Not only would their animal matter serve as food for the plants, but the phosphate of lime of the bones is one of the chief saline constituents of the sugar cane.

Salt is said to be valuable manure for this crop. Dr. Nugent, in a Report made to the Agricultural Society of Antigua, observes that salt has been found a valuable auxiliary in cultivating the sugar cane. Many trials of it, he says, have been made during successive seasons applied generally to the extent of about nine or ten bushels per acre. It destroys grubs and other insects, and give the canes an increased vigor and ability to resist drought. It is a singular remark of the intelligent traveller, M. de Humboldt, while speaking of the practice adopted in the Missions of the Orinoco, when a coco-nut plantation is made, of throwing a certain quantity of salt into the hole which receives the nut ; that of all the plants cultivated by man there are only the sugar cane, the plantain, the mammee, and the Avocada pear, which endure equally irrigation with fresh and salt water.

In the West Indies, when the cane is affected by what is called there the *blast*, which is a withering or drying up of the plants, an unfailing remedy is found to be watering them with an influsion of dung in salt water [L'Explotation de Sucreries.] Porter on the sugar canes. 35, 321.

Preparation of soil.—In the *Rajahmundry* district, during the months of April and May, the ground isfrequently ploughed, until brought into a very fine tilth. About the end of May, or beginning of June, the rains usually commence, and the canes are then to be planted. If the rains do not set in so early, the land is flooded artificially, and when converted into a soft mud, whether by the rain or by flooding, the canes are planted.

In *Mysore*, the ground is watered for three days, and then, after drying for the same period, ploughing commences, this operation being repeated five times during the following eight days. The clods during this time are broken small by an instrument called *col kudali.* The field is then manured and ploughed a sixth time. After fifteen days it is ploughed again, twice in the course of one or two days. After a lapse of eight days it is ploughed a ninth time. Altogether these operations occupy about forty-four days. For planting, which is done in six days, an implement called *yella kudali* is employed.

In *Dinajpoor*, " the field, from about the middle of October until about the 10th of January, receives ten or twelve double ploughings, and after each is smoothed with the *moyi.* During the last three months of this time it is manured with cow-dung and mud from ponds and ditches. On this account, the land fit for sugar cane is generally divided into fields by wide ditches, into which much mud is washed by the rain, and is again thrown on the fields when the country dries, and leaves it enriched by innumerable aquatic vegetables and animals that have died as the water left them. When the ploughing has been completed, the field is manured with ashes and oilcake."

About *Malda*, "the land is first ploughed in the month of Cartick, length and breadth ways, and harrowed in like manner; four or five days after it is again ploughed and harrowed, as before, twice. In the month of Aghun, the whole land is covered with fresh earth, again twice ploughed, and harrowed in different directions, and then manured with dung. Fifteen or twenty days afterwards it is to be twice ploughed, as before; eight or ten days after which, it is to be slightly manured with dung and the refuse of oil, mixed together; then twice ploughed and harrowed in different directions, so that the clods of earth brought be well mixed together with the land. This preparation continues until the 20th or 25th of the month Poons."

In the vicinity of *Dacca*, during "Cautic or Augun (October, November) the Ryots begin to prepare their ground. They first dig a trench round their fields, and raise a mound of about three feet in height. If the ground to be cultivated is waste, about nine inches of the surface are taken off, and thrown without the enclosure. The ground is ploughed to the depth of nine inches more. The clods are broken, and the earth made fine. In Maug or Faugun (January, February) the sugar cane is planted; a month afterwards earth is raised about the plants; after another month this is repeated. The crop is cut in Poous and Maug (December, January). If the ground be not waste, but cultivated, the surface is not taken off. After cutting the crop, it is not usual again to grow sugar cane on the same ground for eighteen months, on account of the indifferent produce afforded by a more early planting.

In the Zillah, *North Mooradabad*, the land is broken up at the end of June. After the rains have ceased it is manured, and has eight or ten ploughings. This clears it of weeds. In February it is again manured and ploughed four or five times, and just before the sets are planted some dung, four cart-loads to each cutcha beegah of low land, and five cart-loads to high land, are added. The land is well rolled after the four last ploughings, and again after the cuttings are set.

About *Benares* and the neighbouring districts, Mr. Haines says, that owing to the hot winds which prevail "from March until the setting in of the annual rains in June or July, the lands remain fallow till that period. In the mean time, those fields that are selected for sugar cane are partially manured by throwing upon them all manner of rubbish they can collect, and by herding their buffaloes and cattle upon them at night, though most of the manure from the latter source is again collected and dried for fuel. When the annual rains have fairly set in, and the Assarree crops sown (in some instances an Assarree crop is taken from the lands intended for sugar cane), they commence ploughing the cane lands, and continue to do so four or five times monthly (as they consider the greater number of times the fields are turned up at this period of the season, the better the crop of cane will be), till the end of October, continuing to throw on the little manure they can collect. Towards the end of October, and in November, their ploughs are much engaged in sowing their winter (or rubbee) crops of wheat, barley, grain &c.; and at this period they make arrangements with the shepherds who have large flocks of sheep, to fold them upon the fields at night, for which they pay so much per beegah in grain. During the latter part of November, and early in December, the fields are again ploughed well, and all grass, weeds, &c., removed with the hoe; then the surface of the field is made as smooth as possible by putting the "*hengah*" (a piece of wood eight to ten feet in length, and five to six inches in breadth, and three or four inches in thickness, drawn by two pairs of bullocks, and the man standing upon the wood to give it weight), over several times for three or four days in succession. This makes the surface of the field very even and somewhat hard, which prevents the sun and dry west wind from abstracting the moisture, which is of great importance at this period of the season, for, should there be no rain, there would not be sufficient moisture at the time of planting the cane to cause vegetation. In this state the land remains till the time of planting the cane cuttings, which is generally the 1st to the 15th of February; but should there have been a fall of rain in the mean time, or excess of moisture appear, the field is again ploughed, and the hengah put over as before. A day or two previous to planting the cane, the field is ploughed and the hengah lightly put over."—(Trans. Agri-Hort. Soc. vi. 4, 5.)

Sets.—When the canes are cut at harvest time, twelve or eighteen inches of their tops are usually taken off, and stored, to be employed for sets. Each top has several joints, from each of which a shoot rises, but seldom more than one or two arrive at a proper growth. When first cut from the stem, the tops intended for plants are tied in bundles of forty or fifty each, and are carefully kept moist. In a few days they put forth new leaves: they are then cleared of the old leaves, and separately dipped into a mixture of cowdung, pressed mustard seed, and water. A dry spot is prepared, and rich loose mould and a small quantity of pressed mustard seed; the plants are separately placed therein, a small quantity of earth strewed amongst them, and then covered with leaves and grass to preserve them from heat. Ten or twelve days afterwards they are planted in the fields.

In *Burdwan*, the tops, before they are planted, are cut into pieces from four to six inches long, so that there are not more than four knots in each. Two or three of these plant tops are put together in the ground, and a beegah requires from 7,500 to 10,240 plants.

In *Rungpore* and *Dinajpoor*, about 9,000 plants are required for a beegah, each being about a foot in length.

In *Beerbhoom*, 3,000 plants are said to be requisite for a beegah, each cane top being about fifteen inches long.

Near *Calcutta*, from 3,000 to 8,000 plants are required for a beegah according to the goodness of the soil, the worse soil needing most plants.

In *Mysore* an acre contains 2,420 stools, and yields about 11,000ripe canes.

Near *Rajamundry* about 400 cuttings are planted on a cutcha beegah (one-eighth of an acre).

In Zilla, *North Mooradabad*, 4,200 sets, each eight inches long, are inserted upon each cutcha beegah of low land, and 5,250 upon high land.

In the district of *Gollagore* the Ryots cut a ripe cane into several pieces, preserving two or three joints to each, and put them into a small bed of rich mould, dung, and mustard-seed from which the oil has been expressed.

At *Radnagore*, when the time of cutting the canes arrives, their tops are taken off, and these are placed upright in a bed of mud for thirty or forty days, and covered with leaves or straw. The leaves are then stripped from them, and they are cut into pieces, not having less than two nor more than four joints each. These sets are kept for ten or fifteen days in a bed prepared for them, from whence they are taken and planted in rows or three together, eighteen inches or two feet intervening between each stool.

Planting.—The time and mode of planting vary.

In the *Rajahmundary Circar*, Dr. Roxburgh says, that "during the months of April and May the land is repeatedly ploughed with the common Hindoo plough, which soon brings the loose rich soil (speaking of the Delta of the Godavery) into very excellent order. About the end of May and beginning of June, the rains generally set in, in frequent heavy showers. Now is the time to plant the cane; but should the rains hold back, the prepared field is watered or flooded from the river, and, while perfectly wet, like soft mud, the cane is planted. "The method is most simple. Laborers with baskets of the cuttings, of one or two joints each, arrange themselves along one side of the field. They walk side by side, in as straight a line as their eye and judgment enable them, dropping the sets at the distance of about eighteen inches asunder in rows, and about four feet from row to row. Other laborers follow, and with the foot press the set about two inches into the soft, mud-like soil which, with a sweep or two with the sole of the foot, they most easily and readily cover."—(Roxburgh on the Culture of Sugar.)

About *Malda*, in the month of Maug (January, February), the land is to be twice ploughed, and harrowed repeatedly, length and breadth ways; after which it is furrowed, the furrows half a cubit apart, in which the plants are to be set at about four fingers' distance from each other, when the furrows are filled up with the land that lay upon its ridges. The plants being thus set, the land is harrowed twice in different directions; fifteen or twenty days afterwards the cane begins to grow, when the weeds which appear with it must be taken up; ten or twelve days after this the weeds will again appear. They must again be taken up, and the earth at the roots of the canes be removed, when all the plants which have grown will appear.

At *Ghazepore* the rains set in at the beginning of March, and planting then commences.

Near *Calcutta* the planting takes place in May and June.

In *Dinajpoor* and *Rungpore* the planting time is February.

About *Commercolly* it is performed in January. The field is divided into beds six cubits broad, separated from each other by small trenches fourteen inches wide and eight inches deep. In every second trench are small wells, about two feet deep. The irrigating water flowing along the trenches fills the wells, and is taken thence and applied to the canes by hand. Each bed has five rows of canes. The sets are planted in holes about six inches in diameter, and three deep; two sets, each having three joints, are laid horizontally in every hole, covered slightly with earth, and over this is a little dung. When the canes are planted in the spring, the trenches must be filled with water, and some poured into every hole. At the other season of planting the trenches are full, it being rainy weather; but even then the sets must be watered for the first month.

Mr. Haines says that in *Mirzapore* and the neighbouring districts, "in planting the cane, they commence a furrow round the field, in which they drop the cuttings. The second furrow is left empty; cuttings again in the third; so they continue dropping cuttings in every second furrow till the whole field is completed, finishing in the centre of the field. The field remains in this state till the second or third day, when for two or three days in succession it is made even and hard upon the surface with the hengah, as before stated."—(Trans. Agri-Hort. Soc. vi. 5.)

Bombay.—Mr. Vaupell, in describing the most ccessful mode of cultivating the *Mauritius* gar cane in Bombay, says, that " after the round is levelled with the 'paur,' in the man- er of the cultivators, pits of two feet in diameter, d two feet in depth, should be dug throughout e field at the distance of five feet apart, d filled with manure and soil to about ree inches of the surface. Set in these pits our canes, cut in pieces about a foot and a lf long laying them down in a tringular form, us ∆. Keep as much of the eyes or shoots f the cane uppermost as you can ; then cover em with manure and soil ; beds should next formed to retain water, having four pits in ch bed, leaving passages for watering them. he cutting should be watered every third day ring hot weather, and the field should always kept in a moist state."—(Ibid. iii 43.)

About *Benares*, the sets require, after lanting, from four to six waterings, until e rains commence, and as many hoeings loosen the surface, which becomes caked ter every watering. The moister nature of the il renders these operations generally un- ecessary in Bengal.

After-culture.—In *Mysore*, the surface of the rth in the hollows in which the sets are plant- l is stirred with a stick as soon as the shoots pear, and a little dung is added. Next month e daily watering is continued, and then the hole field dug over with the hoe, a cavity ing made round each stool, and a little dung lded. In the third month water is given every cond day : at its close, if the canes are lux- riant, the ground is again dug ; but if weakly, e watering is continued during the fourth onth, before the digging is given. At this me the earth is drawn up about the canes, so to leave the hollows between the rows at right gles with the trenches. No more water is ven to the plants, but the trenches between e beds are kept full for three days. It is en left off for a week, and if rain occurs, no rther water is requisite ; but if the weather dry, water is admitted once a week during the xt month. The digging is then repeated, and e earth levelled with the hand about the stools. he stems of each stool are ten or twelve in mber, which are reduced to five or six by the ost weakly of them being now removed. The althy canes are to be tied with one of their n leaves, two or three together, to check eir spreading ; and this binding is repeated required by their increased growth. In the sence of rain, the trenches are filled with ater once a fortnight. When the *Putta putti* to be kept for a second crop, the dry leaves t off in the crop season are burnt upon the ld, and this is dug over, and trenches filled th water, and during six weeks the plants watered once in every six or eight days (unless rain falls), and the digging repeated three times, dung being added at each digging. The after-culture is the same as for the first crop.

In the *Upper Provinces*, Dr. Tennant says, if moderate showers occur after planting, nothing more is done until the shoots from the sets have attained a height of two or three inches. The soil immediately around them is then loosened with a small weeding iron, something like a chisel ; but if the season should prove dry, the field is occasionally watered ; the weeding is also continued and the soil occasionally loosened about the plants. In August, small trenches are cut through the field, with small intervals between them, for the purpose of draining off the water, if the season is too wet. This is very requisite, for if the canes are now supplied with too much moisture, the juice is rendered watery and unprofitable. If the season happens to be dry, the same dikes serve to conduct the irrigating water through the field, and to carry off what does not soak into the earth in a few hours. Stagnant water they consider very injurious to the cane, and on the drains being well contrived depends in a great measure the future hope of profit. Immediately after the field is trenched, the canes are propped. They are now about three feet high, and each set has produced from three to six canes. The lower leaves of each are first carefully wrapt up around it, so as to cover it completely in every part ; a small strong bamboo, eight or ten feet long, is then inserted firmly in the middle of each stool, and the canes tied to it. This secures them in an erect position, and facilitates the circulation of the air. Hoeing cannot be repeated too frequently. This is demonstrated by the practice of the most successful cultivators.

In Zilla, *N. Mooradabad*, in April, about six weeks after planting, the earth on each side of the cane-rows is loosened by a sharp-pointed hoe, shaped somewhat like a bricklayer's trowel. This is repeated six times before the field is laid out in beds and channels for irrigation. There, likewise, if the season is unusually dry, the fields in the low ground are watered in May and June. This supposes there are either nullahs, or ancient pucka wells, otherwise the canes are allowed to take their chance, for the cost of making a well on the uplands is from ten to twenty rupees—an expense too heavy for an individual cultivator, and not many would dig in partnership, for they would fight for the water.

In the vicinity of *Benares*, as the canes advance in growth, they continue to wrap the leaves as they begin to wither up round the advancing stem, and to tie this to the bamboo higher up. If the weather continue wet, the trenches are carefully kept open ; and, on the other hand, if dry weather occurs, water is occasionally supplied. Hoeing is also performed every five or six weeks.

Wrapping the leaves around the cane is found to prevent them cracking by the heat of the sun, and hinders their throwing out lateral branches. In January and February the canes are ready for cutting. The average height of the cane is about nine feet, foliage included, and the naked cane from one inch to one inch and a quarter in diameter.

Near *Maduna*, the hand-watering is facilitated by cutting a small trench down the centre of each bed. The beds are there a cubit wide, but only four rows of canes are planted in each.

It is deserving of notice, that the eastern and north-eastern parts of Bengal are more subject to rain at every season of the year, but especially in the hot months, than the western; which accounts for the land being prepared and the plants set so much earlier in Rungpore than in Beerbhoom. This latter country has also a drier soil generally; for this reason, so much is said in the report from thence of the necessity of watering. The Benares country is also drier than Bengal, therefore more waterings are requisite.

At *Malda*, ten or fifteen days after the earth has been removed from the roots of the canes and the plants have appeared, the land is slightly manured, well cleared of weeds, and the earth that was removed again laid about the canes; after which, ten or fifteen days, it must be well weeded, and again twenty or twenty-five days afterwards. This mode of cultivation it is necessary to follow until the month of Joystee. The land must be ploughed and manured between the rows of canes in the month of Assaar; after which, fifteen or twenty days, the canes are to be tied two or three together with the leaves, the earth about them well cleaned, and the earth that was ploughed up laid about the roots of the canes something raised. In the month of Saubun, twenty or twenty-five days from the preceding operation, the canes are tied as before, and again ten or fifteen days afterwards; which done, nine or ten clumps are then to be tied together.

In the *Rajahmundry Circar*, on the Delta of the Godavery, Dr. Roxburgh states "that nothing more is done after the cane is planted, if the weather be moderately showery, till the young shoots are some two or three inches high; the earth is then loosened for a few inches round them with the weeding iron. Should the season prove dry, the field is occasionally watered from the river, continuing to weed and to keep the ground loose round the stools. In August, two or three months from the time of planting, small trenches are cut through the field at short distances, and so contrived as to serve to drain off the water, should the season prove too wet for canes, which is often the case, and would render their juices weak and unprofitable. The farmer, therefore, never fails to have his field plentifully and judiciously intersected with drains while the cane is small, and before the usual time for the violent rains. Immediately after the field is trenched, the canes are all propped; this is an operation which seems peculiar to these parts. In Dinajpoor, in about a month after planting, "the young plants are two or three inches high; the earth is then raised from the cuttings by means of a spade, and the dry leaves by which they are surrounded are removed. For a day or two they remain exposed to the air, and are then manured with ashes and oilcake, and covered with earth. Weeds must be removed as they spring; and when the plants are about a cubit high, the field must be ploughed. When they have grown a cubit higher, which is between the 13th of June and 14th of July, they are tied together in bundles of three or four, by wrapping them round with their own leaves. This is done partly to prevent them from being laid down by the wind and partly to prevent them from being eaten by jackals. During the next month three or four of these bunches are tied together; and about the end of September, when the canes grow rank, they are supported by bamboo stakes driven in the ground. They are cut between the middle of December and the end of March." If the canes grow too vigorously, developing a superabundance of leaves, it is a good practice to remove those leaves which are decayed, that the stems may be exposed fully to the sun. In the West Indies, this is called *trashing* the canes. It requires discretion; for in dry soils or seasons or if the leaves are removed before sufficiently dead, more injury than benefit will be occasioned.

Harvesting.—The season in which the canes become ripe in various districts has already been noticed when considering their cultivation. In the Rajahmundry Circar, about the month of the Godavery, Dr. Roxburgh adds, "that in January and February the cane begins to be ready to cut which is about nine months from the time of planting. Their height, when standing on the field, will be from eight to ten feet (foliage included), and the naked cane from an inch to an inch and a quarter in diameter."

In *Malda* the canes are cut in January and February. In N. Mooradabad, upon the low land, the canes are ripe in October, and upon the high lands a month later. The fitness of the cane for cutting may be ascertained by making an incision across the cane, and observing the internal grain. If it is soft and moist, like a turnip, it is not yet ripe; but if the face of the cut is dry, and white particles appear, it is fit for harvesting.—(*Fitzmaurice on the Culture of the Sugar Cane.*)

Injuries.—1. *A wet season*, either during the very early or in the concluding period of the cane's vegetation, is one of the worst causes o ijury. In such a season, the absence of the usual tensity of light and heat causes the sap to be ery materially deficient in saccharine matter. ut, on the other hand,

2. *A very dry season*, immediately after the ets are planted, though the want of rain may in ome degree be supplied by artificial means, caus- s the produce to be but indifferent. These iconveniences are of a general nature, and irre- ediable.

3. *Animals.*—In India not only the in- irsions of domesticated animals, but in some istricts, of the wild elephant, buffalo, and hog, re frequent sources of injury. Almost every lantation is liable, also, to the attack of the ackal, and rats are destructive enemies.

4. *White Ants.*—The sets of the sugar cane ave to be carefully watched, to preserve them om the white ant (*Termes*), to attacks from hich they are liable until they have begun shoot. To prevent this injury, the following ixture has been recommended :—

Asafœtida (hing), 8 chittacks.
Mustard-seed cake (sarsum ki khalli), 8 seers.
Putrid fish, 4 seers.
Bruised butch root, 2 seers ; or muddur, 2 seers.

Mix the above together in a large vessel, with ater sufficient to make them into the thickness f curds ; then steep each slip of cane in it for alf an hour after planting ; and, lastly water e lines three times previous to setting the cane, y irrigating the watercourse with water mixed p with bruised butch root, or muddur if the rmer be not procurable. That the above ap- lication would be beneficial, is rendered still ore worthy of credit from the following experi- ice:—In the Dhoon, the white ant is a most rmidable enemy to the sugar planter, owing to e destruction it causes to the sets when first lanted. Mr. G. H. Smith says, that there is wood very common there, called by the na- ves *Butch*, through which, they say, if the irri- ating waters are passed in its progress to the eds, the white ants are driven away. (Trans. gri-Hort. Soc. of India, v. 65.] The experi- ice of farmers in Europe, has however shown iat the use of any poisonous drug, to protect e seed or sets, is highly dangerous to the health those who eat the produce, and the employ- ent of " Butch" or arsenic cannot therefore e recommended. A very effectual mode of estroying the white ant, is by mixing a nall quantity of arsenic with a few oun- s of burned bread, pulverised flour, or oat- eal, moistened with molasses, and placing ieces of the dough thus made, each about the ze of a turkey's egg on a flat board, and cover- l over with a wooden bowl, in several parts of e plantation. The ants soon take possession f these, and the poison has a continuous effect, r the ants which die are eaten by those which succeed them. (*Fitzmaurice on the Culture of the Sugar Cane.*) They are said to be driven from a soil by frequently hoeing it. They are found to prevail most upon newly broken-up lands.

In *Central India*, the penetration of the white ants into the interior of the sets, and the consequent destruction of the latter, is prevented by dipping each end into buttermilk, asafœtida, and powdered mustard-seed, mixed into a thick compound.

Storms.—Unless they are very violent, Dr. Roxburgh observes, "they do no great harm, because the canes are propped However, if these are once laid down, which sometimes happens, they become branchy and thin, yielding a poor, watery juice.

Maize Sugar.—The stem and branches of Indian corn, during the time that its grain is filling, abounds with sugar, even when grown in England ; so much so, that it might be turned to account by those of the peasantry who have small plots of ground attached to their cottages ; and by a simple method a rich syrup may be obtained from it, equal in sweetness to treacle, and superior to it in flavor. The proper time for cutting down the plant (which should be done within an inch of the ground), is when the corn in the ear is small and full of a milky juice. All the large and old leaves should be stripped off, leaving only the young and tender ones ; they should then be cut into short lengths, thoroughly bruised, and the juice entirely pressed out from them. Where the means cannot be obtained for expressing the juice by this method, the following may be employed :—After the plants have been cut into small pieces, put them into a large pot or copper, with only just sufficient water to extract the juice ; boil for one hour, and then strain off the liquor ; to each gallon of this liquor add a wine-glass full of lime-water whilst warm ; but if it be the expressed juice, obtained as above mentioned, add double the quantity of lime-water. When the liquor is cold, for every three gallons beat up an egg with some of the liquor ; put altogether into a boiler, and boil gently till the syrup acquires the consistence of treacle. Whilst this is going on, the liquor should every now and then be well stirred, and the scum which rises to the surface taken off. This syrup, which will be found a better substitute for sugar than treacle, and more wholesome, should be kept in lightly-covered vessels, in a dry place.—*Extracts from Simmonds, pages* 137 *to* 215.

Sugar cane, its History.—*Sugar* has, from an early period of the world's history, been used in some form or other as an article of food ; indeed, the practice of sweetening food is more ancient than the knowledge of sugar. The juice of a large number of vegetables owes its sweetness to the presence of sugar.

The ancients used honey for the purpose; and at a later period, when a sweet substance, which exuded from a species of cane, was used, it was termed *mel arundinaceum*. Dioscorides, in the first century, refers to a kind of honey produced by canes growing in India and in Arabia Felix, and named *σάκχαρον*, or *sugar*. Pliny records the same fact, but remarks that it was used only in medicine. Sugar was not known in Northern Europe as an article of food, until the time of the Crusaders. The sugar-cane was introduced into Cyprus from Asia, and about the year 1148 is said to have been largely cultivated there; at which time it was transplanted to Maderia, and from thence, in 1506, to the West Indies. There is evidence that the sugar-cane was cultivated on the coast of Andalusia before the invasion of the Arabs, in the middle of the fifteenth century. The Arabs had many sugar factories, and with them probably originated the art of boiling down the juice for the production of sugar. The refining of the raw product is of later date, and is referred to a Venetian. In the year 1597, a refinery existed in Dresden.

Sugar making and Refining.—Sugar-candy is mentioned in the *Alchemia* of Libanius in 1595. Up to the close of the seventeenth century, syrup and honey were used by the poorer classes in Germany for sugar; and it was not until tea and coffee had come into general use that sugar was regarded as one of the necessaries of life. In the year 1747, Margraf, a German chemist, discovered that cane sugar existed ready formed in the roots of many plants, especially in beet-root; but nearly half a century elapsed before any attempt was made to establish a factory of beet-root sugar; this was done by Achard, at Cumoom, in Silesia, not, however, with any great success. The first energetic impulse that was given to the manufacture was by Napoleon, who, anxious to ruin the colonial trade of Great Britain, ordered the blockade of the continent, and in order to supply the demand for sugar, which formed so important a part of our commerce, he offered premiums for the best methods of separating sugar from beet-root. The chemists of France exerted themselves with their accustomed method and skill. Extensive experiments were made on the cultivation of the beet-root, and the best method of obtaining its juice, and extracting the sugar from it. Factories were soon at work, and the first sample of French beet-root sugar was conveyed at once to the emperor, who received it with joy, placed it under a glass case as one of the choicest ornaments of his drawing-room. The extensive and valuable series of apparatus invented or improved by his subjects, for the preparation of beet-root sugar, adapted by the English, have been the means of saving English colonies, which had prospered in spite of his opposition, but which at a later period, chiefly by the renunciation of slave labour, had been brought to the verge of ruin.

Chemical Relations of Sugar.—Sugar may be defined as a substance soluble in water, possessing a sweet taste, and capable of undergoing fermentation. There are two leading varieties of sugar: one the produce of the *Arundo saccharifera*, or sugar-cane; also found in beet-root, in the sap of certain species of maple, in the stems of palms, maize, &c., and known as *crystalline* or *cane-sugar*: the other contained in grapes, figs, plums, and fruits in general, and is known by the several names of *granular*, or *grape sugar*, *glucose* or *sugar of fruits*. Fruit sugar is however distinguished by some chemists from grape-sugar, as will be noticed more particularly hereafter. The property of submitting to the action of ferments and resolving itself into carbonic acid and alcohol is peculiar to fruit or grape-sugar; and when other varieties of sugar undergo this remarkable process, they are by the action of ferments first converted into fruit or grape-sugar, and then undergo fermentation. Cane-sugar is further distinguished from fruit or grape-sugar by its pure and powerful sweetness, and the facility with which it crystallizes. Grape sugar is very inferior in sweetness; it crystallizes imperfectly, and is usually obtained in a granular state. It is accompanied in fruits by malic, citric, or tartaric acid. It may be produced artificially by the action of various agents on cane-sugar, and also upon lignin, starch, and gum. It forms the solid crystalline portion of *honey*; it also occurs in urine in the disease called *diabetes*. The term sugar has also been applied to *manna* or *mannite*, which occurs in the juice of some kinds of ash, in orchard trees, in celery, &c.: this kind of sugar, however, does not ferment. The juice of the *liquorice* root, and a few other substances, are also classed under sugar.

Cane-sugar.—Cane-sugar, when pure, is white and brittle: it becomes phosphorescent by friction, and a lump, on being broken, emits an electric spark which is visible in the dark. Its density is about 1·6. It dissolves in about one-third of its weight of cold water, but in a much smaller quantity of boiling water. The *syrup* thus formed is viscid, and on being evaporated at a moderate heat, deposits fine crystals of *sugar candy*, of which the usual crystalline form is a six-sided prism commonly flattened and terminated irregularly. The crystals are said to consist of 100 parts sugar, and 5·6 parts of water. A solution, saturated at 230°, forms in cooling a granular mass or *tablet*, but when the solution is rapidly boiled down until it acquires a tendency to vitreous fracture on cooling, or when fused at about 280°, or until a portion *feathers* or concretes on being thrown off from a stirrer, it may be poured out upon a marble or uetal slab, and will form a transparent amorphous mass on cooling. This vitreous mass was ormerly obtained by rapidly boiling down a oncentrated solution of sugar in barley-water or weet-wort, and hence the name of *barley-sugar* pplied to sticks of it formed by cutting the morphous mass while hot into strips, rolling the trips into cylinders. and then giving a spiral wist to the cylinders. In this state the sugar is itreous and transparent, but after some time specially if exposed to air, it crystallizes, acquires . fibrous or granular texture, becomes opaque irst on the surface, and then throughout the nass. Confectioners add a small quantity f vinegar or tartaric acid to the sugar vhich retards this tendency to opacity. The how-sticks which are kept in the windows f grocers &c. are made of coloured glass very ccurately resembling the barley-sugar in its reshest and most transparent state. The tenency to crystalize is also removed by keeping he syrup for a long time at a temperature ear its boiling point ; but in such case a portion f the sugar probably passes into glucose.

The cultivator distinguishes 3 species of canes. . The *Oreole* cane, which has dark green leaves, nd a thin but very knotty, stem ; it is indigenous o India, and was transplanted thence to Sicily, he Canary Isles, the Antilles, and to South merica. 2. The *Batavia*, or *striped* cane, vhich has a dense foliage, and is covered with urple strips ; it is chiefly cultivated in Java for he manufacture of rum. 3. The *Otaheite* cane rows most luxuriantly : it is the most juicy, and ields the largest product. This variety is hiefly cultivated in the West Indies and South merica. It becomes ripe enough for the mill t 10 months, and is more hardy than the other arieties. The sugar cane being originally a bog lant, requires a moist nutritive soil, and a hot, ropical, or subtropical climate. It is propagatd by slips or pieces of the stem with buds on hem, and about 2 feet long. It takes from 12 o 16 months, according to the temperature, efore it arives at maturity. Towards the flowerng season the leaves fall off, and the stem acuires a straw-yellow colour. Some plantrs cut the cane before the flowering season, ut generally some weeks after. The plantations re so arranged that the various divisions of the elds may ripen in succession. The land should e well supplied with manure rich in nitroen, but not containing much saline matter.

A beet-root factory established at Naples, near he sea-shore, experienced heavy losses in conseuence of employing beet-roots grown in the eighbouring fields ; and we have also heard of imilar losses in a German factory from the se of beet grown in a field in front of the raduation-house of the salt works at Manheim. similar effect has been observed with respect o sugar-cane. Those which are grown near the sea make an inferior sugar to those grown inland ; the quantity of melasses is greater, and the sugar more deliquescent. Mr. Kerr states, [A Practical Treatise on the Cultivation on the Sugar cane and the Manufacture of Sugar, by Thomas Kerr, Planter, Antigua, London, 1851.] that on the windward coast of Barbadoes he has tasted melasses as salt if it had been mixed with strong brine. After the harvest the roots strike again and produce a fresh crop of canes ; but in about six years they require to be removed. The time for cutting the canes varies with the soil and season, and the different varieties of the cane. The usual signs of maturity are a dry, smooth, brittle skin; a heavy cane ; a grey pith, approaching to brown ; sweet and glutinous juice. The canes should be cut in dry weather, or the juice will be diluted with an excess of water. The development of the buds which form the secondary stole of a plant that has been cut, are named *rattoons*, and they are *first*, *second*, or *third*, &c., according to the age of the root which produces them. They diminish every year in length of joint and circumference, and although they have not the handsome appearance of the original plant they yield much richer juice and produce finer sugar. The juice from the rattoons is also said to be more readily clarified than that from the plant cane. The canes should be cut as close to the stole as possible, in order to give vigour to the rattoons that are to spring from the old root : besides this, the juice of the lower joints is the richest in the cane. The cane-top, with one joint of the cane, or two joints if not quite ripe, must also be cut off. The canes are tied up in bundles, and conveyed to the crushing mill, particular attention being paid that the supply does not exceed the demand, otherwise the cut canes would ferment and spoil. Mr. Kerr recommends that the land should be deeply ploughed and thoroughly pulverized ; that cultivation should no longer be carried on by hand, but with implements, as in the best farming in England ; and in putting in a plea for the better treatment of the cattle, he reminds the planter that the Psalmist, in praying for the prosperity of his people, asks emphatically, among other blessings, that " our oxen may be strong to labour, that there be no decay." Mr. Kerr states, that it is usual to plant the canes in parallel rows 6 feet apart, and the canes 4 feet from each other in the row. He recommends wider spaces, such as eight feet between the rows ; and states that in Barbadoes, in 1847, 90 acres of cane, planted 8 feet by 4 yielded 230 hogsheads of sugar. Some have even recommended to increase the distance to 10 feet, and others have advocated 8 feet square : that is, the canes in rows 8 feet apart and 8 feet distant from each other. It is also advisable to extend the planting over a period of 5 months ; to begin early, so as to finish before the rainy season sets in. In addition also to the many advantages of returning the cane-trash to the land, Mr. Kerr states, that by spreading it over the spaces between the cane rows, it prevents the disastrous effects of severe droughts. The cheap rate at which coals can be sent from Great Britain to the colonies makes it desirable to abandon the use of cane-trash as fuel. The juice of the sugar-cane consists of a nearly pure solution of sugar in water, with traces of albumen, about $\frac{7}{1000}$ of gum and a peculiar substance resembling gluten or vegetable gelatine, which is deposited in large quantities in the vats in which sugar is fermented for making rum. The juice also contains of cerosin and a green vegetable wax, about $\frac{3}{100}$ to $\frac{4}{100}$. The mineral ingredients are similar to those in other plants and vegetable juices, and consist of the sulphates of lime, and potash, chlorides of potassium and sodium, phosphate of lime, silica &c. The juice is sometimes colourless, but generally yellow : it is made turbid by the presence of greyish globules of suspended matter. Its taste is agreeable, but rather insipid, and it has a peculiar balsamic odour. After the cane has been passed through the rollers and as much of its juice squeezed out as this imperfect method admits of, it is called *cane straw*, *bagasse* or *cane-trash*. It consists of—

	Martinique. Otaheite	Guadaloupe. Cane.	Cuba. Creole cane.
Water	72.1	27	65.6
Sugar	1·8	17.8	17.7
Woody matter...	9·9	9,1	16.4
Salts	——	0.4	—--

The trash is used as fuel in evaporating the juice as already stated. 100 parts of its ash consist of—

	Trinidad.	Berbice.
Silica........................	45·78	46·24
Phosphoric acid...........	3·75	8·12
Sulphuric acid.....	6·64	7·48
Chlorine......	2·70	2 39
Lime.........	9·13	5·75
Magnesia......	3·65	15·53
Potash........................	27·32	11·87
Soda..........................	1·03	2 62

It is important to observe, that while the chemist has proved that as much as from 17 to 20 per cent. of crystalline cane-sugar exists in the cane or fresh juice, the sugar-boiler in the colonies does not obtain more than 7½ per cent., or less than one-half. His object is to convert the juice as speedily and with as few operations as possible into raw sugar ; hence he has not been very active in improving on the old method of manufacture, which entails loss or deterioration of juice at every stage of the process : there is first a large loss in consequence of the imperfect method of expressing the juice from the cane, and, secondly, a chemical change in consequence of long exposure to the atmosphere at ordinary as well as at high temperatures, whereby the crystalline sugar becomes degraded into mucilaginous or non-crystalline sugar, commonly called *molasses* or *treacle*. The juice of the cane is purer, and contains twice as much sugar as that of beet-root, and yet the manufacturer of beet-root sugar manages, by means of improved processes and apparatus, to make the beet-root juice as productive as cane juice. It is true that the planter labours under certain disadvantages which may not be altogether compensated by a richer juice ; the sugar cane contains 2 or 3 times as much woody fibre as the beet, which is soft and full of cells, while the cane is fibrous and spongy, and is surrounded by a hard integument difficult to submit to pressure. Moreover in the climate of the sugar cane the ordinary temperature of the air is highly favourable to fermentation, so that the danger of decomposition is greater than in the case of the beet. The fact however, still remains, that while science has been actively employed in perfecting the manufacture of beet-root sugar, she has, until recently done little or nothing for the manufacture of cane-sugar ; and now that attention had been fairly directed to the subject, in consequence of the depressed condition of our colonies, much of the beet-root apparatus is found to be admirably adapted to the wants of the colonial sugar boiler. The original crushing apparatus of India was a kind of squeezing mortar, made out of the hollow trunk of a tamarind-tree, worked by a yoke of oxen, the pestle or stamper being a strong beam, 18 feet long, and rounded at the bottom so as to squeeze or crush the canes in the mortar. Squeezing mills, similar to those used for expressing oils from seeds, were also used. There were also other forms of apparatus before rollers were introduced. Rollers of stone or iron were first used with the axes in a vertical position ; but the horizontal was soon found to be more convenient and economical. The scarcity of fuel is so great in some of the colonies, that it has even been purposed, instead of expressing the sugar-cane, to cut it in slices to dry them, and send them to Europe for manufacture into raw or refined sugar. But the very defect of fuel which led to this proposition would evidently be the chief barrier to carrying it out, since the fuel required for drying the canes would be wanting. The true remedy for the enormous waste that attends the present mode of manufacturing raw sugar, must be found in the application of a regulated steam heat with coals for fuel, while the cane trash shall be left to its more legitimate application of manuring the land for future crops. The waste of sugar by the old process has attracted the notice of French as well as English writers. Thus Dumas states that of the 84 to 90 per cent of juice in the fresh cane, only from $\frac{2}{3}$ds to $\frac{6}{7}$ths are obtained from the presses : that this $\frac{2}{3}$ds contain only 12 per cent.

f the sugar actually existing in the fresh cane, per cent. being left in the trash which is used s fuel : so that for every 80 milions of kilogram- nes of raw sugar imported into France, 40 nillions of kilogrammes have been burnt in roducing them, the value of which, about 20 nillions of francs, is actually thrown into the fire.

Clarification or *defecation* of the juice is produced by heat, which coagulates the albumen, nd by the addition of lime, which neutralizes he acid, and renders some of the solid impuri- ies insoluble. By the old method an arrange- nent called the *copper wall*, consisting of 5 pans, ron boilers, or *teaches*, as they are called, walled ogether in a row, and heated by one common ire, are used for the purpose. From the juice eservoir, below the crushing mill, the juice is onducted into the clarifying pan, the fifth in the ow, the largest, and farthest from the fire. It hould be capable of holding the whole of the uice produced at one crushing, and should be eady to receive the juice almost as quickly as t is expressed. In some cases two copper valls are built under the same shed. The roper dose of milk of lime, or *temper*, as it is alled, should be measured out by means of a essel graduated into inches, each inch corres- onding to 4½ oz. of milk of lime. Not less han 5, or more than 10 oz. are required to larify 1,800 litres, or about $\frac{1}{1000}$ to $\frac{3}{1000}$ the ntire weight of juice. When the proper tem- erature has been acquired, 10 litres of juice ield 15 grammes of precipitate, containing,

Gum resembling cherry gum	50.25
Green matter (chlorophill)	10.05
Albumen, with particles of wood fibre	22.78
Phosphate of lime	3.35
Silica	14.07
	100.60

he phosphoric acid is originally present in the orm of an acid salt; hence if copper vessels be used n clarifying, the metal is soon attacked and phos- hate of copper formed : the lime converts this alt into a basic phosphate, which combines with ilica and organic matters, and materially assists he precipitation of foreign ingredients. A dense mpure scum collects on the surface, and is re- noved by skimming. The juice is then passed hrough the other 4 teaches, and heated until he evaporation is complete. During this pro- ess a large quantity of thick scum is removed y means of a perforated copper plate attached o a handle. The formation of this scum is a triking illustration of the defects of the system, or the scum consists of nearly pure sugar, de- omposed by heat, together with the natural im- urities of the juice : it is passed into the me- asses cistern, and is chiefly used for making rum. As the bulk of juice is diminished by evapora- ion, so the teaches are usually made to diminish n size, the juice being passed from one to the other by a copper ladle or dipper worked by hand. The sugar is greatly injured by this repeated ladling and exposure in small quantities, to the atmospheric air, and indeed the whole plan justifies the satirical remark, that it is "an elaborate and effectual means of converting pure sugar into melasses and scum." And Mr. Kerr remarks, that "the whole system, from the breaking up of the first clod of earth, to the rolling of the hogshead of sugar into the waggon, appears to have been expressly contrived for employing the greatest possible amount of labour." When most of the scum has been removed in a compact form from the clarifier, the juice is ladled to the next pan, and as it diminishes in volume fresh juice is added. The pans are in some cases on different levels, so that the juice may be drawn off from one into the next below it, by means of a syphon; but the pans are not usually terraced, so that the juice has to be scooped from pan to pan. In the second pan the concentration begins; the boiling liquor throws up a scum, which the negroes collect and return to the clarifying vessel. In the last pan but one the juice is concentrated to 30° Baume, and it is then passed into the last and smallest pan, which is situated directly over the fire. Here the boiling is tumultuous, in consequence of the formation of *panstone*, a deposit of lime consisting of—

Basic sulphate of lime	92·43
Carbonate of lime	1·35
Silica	4·70
Phosphate of copper	1·41
	99·89

with organic matter. The panstone forms more or less in all the boiling operations : it causes the juice often to be over-heated, the sugar to be burnt, and caramel to be formed, as when the incrustation cracks and the juice comes in contact with the hot metal. The crust is from time to time removed by heating the empty pan to redness, when, in consequence of the greater expansion of the metal, the crust breaks up and peels off. Sometimes the last and smallest copper contains a *skipping-teach*, a smaller vessel of the same shape, with a valve at the bottom worked by a handle. This vessel is let down by a crane into the pan, removes the sugar from it and conveys it to the coolers. In some cases, the concentrated syrup is discharged down shoots into the coolers. Sometimes the term *teache*, or *tayche*, is applied only to this last vessel, in which the syrup is reduced to the *granulating* point, or sufficiently concentrated to separate on cooling into grains of sugar. The required consistency is ascertained by taking a small portion of the syrup upon the thumb, then bringing the forefinger in contact with it, and again separating them, noting the length to which a thread of syrup can be drawn before it breaks; if it extend to about half an inch in length, the sugar is judged to be fully boiled. This trial by the *touch* is supposed to have given the name of *teache* to the pan. The coolers are shallow open vessels, each capable of containing about a hogshead of sugar. They are of wood, with thick sides, that the cooling may be gradual. In about 24 hours the sugar grains, or forms, into a soft mass of crystals, inbedded in melasses, which are separated in the *curing-house*, to which the soft sugar is removed. The sugar in the coolers is frequently stirred with iron rods, to produce a uniform temperature and consistency. The curing-house is a large building, the lower part of which is lined with lead, forming the melasses' reservoir. Over this, on an open framing, are placed the hogsheads or *potting-casks*. In the bottom of each cask are bored several holes an inch in diameter, into each of which is placed a plantain stalk, or a crushed cane, of sufficient length to reach to the top of the hogshead. The soft sugar being placed in these casks, the melasses gradually drain away through the spongy stalks or canes, leaving the crystalline portion tolerably dry. In 2 or 3 weeks, or 5 or 6 if the mass be mucilaginous and the grain small, it is fit for shipment; a further drainage of melasses takes place in the hold of the vessel, and even after this there are melasses entangled with the crystals of the raw sugar, to the injury of its quality. Such is *raw* sugar of commerce: it varies greatly in quality, but really consists of a crystalline flour of pure sugar, moistened throughout with melasses, often to the extent of one-third of its weight, and often more than the crystals can contain. Hence as it attracts moisture from the damp air of the vessel and becomes more liquid, it escapes from the crevices of the casks. It is calculated that about 12 per cent. of sugar is lost in this way from the English colonies alone, or about 27,000 tons annually. In places where the sugar is not packed in hogsheads for the sea voyage, it is set to drain in the curing house, in wooden moulds of deal. The syrup which drops from the moulds, or from the hogshead, into a cistern, deposits on cooling a sugar, the grain of which resembles fine sand, and forming a layer on the bottom several inches in thickness. This inferior product is called by the French planters, *fond de cisterne*. It averages about 10 per cent. of the raw sugar, depending on the temperature at which the sugar is placed in the moulds. It has a moist and smeary character, and is an admixture of various salts, of gelatinous silica, mucous or gum deposited from the refuse syrup, or mother-liquor, of the first crop of crystals. The defects of the old system most plainly appear from the various modes adopted for calculating the loss. We have already given one or two estimates, and will conclude this section with one or two more. From every 1,000 parts of sugar-cane the old process yields from 60 to 80 parts raw sugar, and 25 to 30 of melasses; while according to chemical analysis the yield should be 180 to 200 parts of crystallized sugar. The following table has been drawn up from a large number of comparative results:—

In 1,000 parts—

Raw Sugar	79	73
Melasses	30	27
Trash	386	395
Water	505	505

Thus of the 180 to 200 parts of crystalline sugar in 1,000 parts of cane, there are obtained from 73 to 79 parts of raw sugar: 18 to 20 parts of melasses; cane trash, 28 to 33; and waste in the process of manufacture, from 48 to 61 parts. Mr. Kerr also states that of the 1,500 gallons of juice required to make a hogshead of sugar netting 15 cwt. in the English market, the planter does not get a return of more than 6 per cent. of moist muscovado sugar, and that of very inferior quality.

Improved System of Manufacturing Raw Sugar.—The various improvements in the rude process of manufacturing sugar described in the last section have for their objects the preservation of the juice from fermentation, and its concentration with as little agitation and exposure to the air, and at as low a temperature as possible. Several proposals have been made for removing or diminishing the causes which lead to the rapid fermentation of the juice. Among other plans, Dr. Mitchell proposed to destroy the vitality of the glutinous fermenting matter, and to coagulate the albuminous substance in the tissue of the cane, by plunging the canes into some boiling liquid as soon as possible after they are cut. This plan would prevent the albumen, &c., from passing into the juice by expression. From some experiments made on this subject, it appears that a colourless juice was obtained: it was full of floating feculæ which immediately subsided, and the juice being decanted off and boiled down without the addition of any lime or temper, or any necessity for skimming, furnished a pure white sugar. By this process, the juice is diminished in quantity, but increased in density. Some of it was kept for 18 hours without undergoing any change. M. Payen recommends the use of sulphurous acid or of bisulphite of lime for preventing the rapid fermentation of the juice. He advises that the ends of the canes be dipped into a solution of the bisulphite as soon as they are cut. An infusion of tannin or nut-galls has also been recommended for the separation of the diliquescent matter and soluble salts. As the crushing-mill is generally on the ground, the juice is raised to the clarifying vessels by force-pumps of peculiar construction, and with very little agitation. For this purpose it is admitted into an apparatus called a *monte-jus*, from which it is forced up a pipe by the pressure of steam on the surface of the liquor where is a vessel for receiving the juice, which passes into it by a pipe for supplying steam for forcing the juice up. There is an air-cock, through which the air escapes on the admission of the juice: the pipe attached to this cock dips 2 or 3 inches below the top of the cylinder, so that the juice never rises above that height: the space above being filled with air, acts as a cushion between the steam and the cane-juice, thereby preventing the juice from being heated to the temperature of the steam. The pipe is not only continued to the bottom of the receiving vessel, but dips into a sunken receptacle, by which means all the juice is collected; for it is of importance not to leave layers of juice at the bottom of vessels to ferment and damage the fresh juice afterwards added. Steam-heat is used for the clarifying vessel, into which the juice is raised by the monte-jus. This vessel consists of a hemispherical copper pan surrounded by a cast-iron jacket, and steam is admitted into the space between the two, the supply being regulated by a valve. On the top of the copper pan is fixed a *light course* or copper band, from 15 to 18 inches deep, to prevent the scum from frothing over. The plug in the bottom of the pan is furnished with two or three holes, through one of which clarified juice passes down the hollow of the plug to the smaller channel of the two-way cock. When the clear liquor is run off, the plug is removed by the means of the handle and the thick scum and sediment pass off through the larger way. The condensed steam passes away by a pipe and there is a cock which is opened for a short time on the admission of steam, to allow the air to escape. The clarifier being filled with juice, steam is admitted and the temperature raised to 176° Fahr. Any particles which rise to the top of the liquor are skimmed off, and milk of lime is poured in in quantities just sufficient to neutralize the acid, which is ascertained by the frequent use of litmus paper. The heat is continued until there is formed a thickness of 3 or 4 inches of scum, consisting of most of the impurities of the juice. In about 10 or 12 minutes from the first application of heat the scum should be well formed and about to break up. The moment it begins to crack the steam is shut off, and the liquor being left for 15 to 20 minutes, the lighter impurities will have mostly risen to the surface, and the heavier ones sunk to the bottom, while between the two is a pale and beautifully clear liquor. The hollow plug which is ground into the hole in the bottom of the pan, is now turned by its long handle so as to throw open a hole in the side 3 or 4 inches from the bottom, and consequently above the subsided impurities: by this opening the clear liquor escapes, and proceeds along the small channel of the two-way cock until scum begins to appear; the cock is then turned on to the larger way, the plug is altogether removed, and the heavy matters and scum pass out through the hole, and are conveyed to a cistern, placed in bags, and the juice squeezed out. The juice in the clarifier is never allowed to rise above 208° or 209°, or the impurities would become so mixed up with the juice as to be incapable of separation; a result which will also be attained unless the process be speedily conducted. The clarified juice still contains matters in suspension, which require to be removed by filtration. The filters consist of fine copper-wire sieves in sets of 4 or more each, the one above fitting into the one below, the mesh of the lower sieves increasing in fineness. In filling in the bone-black, the first few inches are pressed compactly down; after which it is filled lightly, but evenly, to within a short distance of the top, where a space is left for the accumulation of the cane juice. In the charcoal filters used in France, upon the false perforated bottom a filter-cloth is spread, and upon this the charcoal is placed, first in well packed layers, and afterwards a little more loosely. Another cloth is placed on the top, and upon that a perforated plate of metal. The syrup to be filtered is let in from the cistern and the supply is regulated by a ball-cock, a certain quantity being always kept at the top of the filter to prevent the charcoal from drying and dividing into vertical channels or cracks, and forming what the French call *de fausse voies*. To allow the syrup to accumulate in the bottom reservoir of the filter, it is necessary to let the air escape, for which purpose a tube is provided. There is a man-hole for cleaning out the filter when required. The object of filtering is to remove all vegetable colouring matter and any excess of lime that may have been accidentally added in the clarification, together with mineral salts, such as sulphate of lime, originally present in the juice. About 5 tons of animal charcoal are required for every 100 tons of sugar made. After this the charcoal is reburnt, and thus its useful properties are restored to it. When filtered liquor is ready for evaporation, according to the improved processes, it may be conducted either in the *vacuum-pan* or in open pans, containing a coil of steam-pipe. The usual plan is to concentrate the liquor in open pans to the density of 25° to 28° Baumé, up to which point it is not greatly acted on by the atmosphere. The evaporators used for this purpose are large iron vessels, with copper pipes at the bottom bent round, the extremities of which terminate in a straight gun-metal tube passing through stuffing-boxes: the pipe, which conveys the steam, is at one end of the straight tube, and the pipe which discharges the condensed water at the other. By this arrangement the pipes can be raised up out of the vessel for the purpose of cleaning it thoroughly; for if the cane juice be allowed to hang about the pipes, it will become acid and infect the next charge. By means of a lever the evaporator can be tilted into a sloping position for the purpose of better running off the evaporated juice by the cock. In these vessels the juice is evaporated to about 27° B. before going into the vacuum-pan. The drainings are collected in pots or treacle-jars which support the moulds, and are boiled down with other refuse of the sugar-houses into an inferior sugar. A separate pot for each mould is not to be commended, for if the pots are not well washed out there is a liability to fermentation, or *smear*, as it is called, and this will spread through the whole establishment with astonishing rapidity, and when once formed is difficult to eradicate. We have heard of a sugar-refiner who had to work up the whole of his stock twice before this evil could be got rid of. The use of pots is, in many cases, superseded by supporting the moulds in frames, and allowing them to drain into gutters or false floors of thin sheet-copper, sloping towards a centre constructed under the main floor, where the syrup is conveyed by copper pipes to a cistern. It has been proposed to expedite the draining of the moulds by connecting their nozzles with a pipe communicating with an air-pump; but in such an arrangement the sugar would be liable to be drawn through the perforations with the syrup. Several other plans on the vacuum principle have also been proposed. When the sugar is properly drained it is taken out of the moulds in the form of loaves, which are trimmed to shape, placed in a stove or hot room of the temperature of 130° to 130,° and when the moisture has evaporated, they are fit for the market. The sugar thus obtained is half the weight of that let down into the heater from the vacuum-pan: the remainder consisting of moisture or drainings. A very small proportion of the syrup that drains away consists of uncrystallizable sugar or treacle in which all the impurities of the loaf are accumulated. If the improved operations have been well conducted the produce is equal to refined sugar, and there is no practical reason why perfectly white sugar should not be produced from the canes at one operation. The sugar, as it comes direct from the canes, contains only 1·5 per cent. of impurities, whereas the sugar-refiners in England have to operate on a material considerably deteriorated by previous mismanagement. Fiscal regulations have hitherto interfered with colonial improvement, a larger duty having been imposed on sugar above a certain standard, thus actually discouraging the production of white sugar at its natural seat of manufacture, and encouraging slovenly and bad work. In the islands of Java and Cuba, where the best machinery has been introduced, from 30 to 40 per cent. is now saved in the quantity of sugar produced, and its market value is increased from 5*s.* to 10*s.* per cwt. The manufacture of *sugar-candy* may be regarded as a branch of the refiner's art. The large crystals of sugar, which pass by this name, are prepared from a syrup clarified with a less quantity of charcoal-powder than is usual, and not passed through the filter. The crystals, which are coloured, inclose a certain portion of non-crystalline sugar. If the candy is required for the sake of its solvent action on the mucous membrane of the throat, it should not be prepared from clarified or clayed sugar. To increase its mucilaginous and sticky properties it should, after clarification with white of egg, be boiled over an open fire and not in vacuo; and for the darker kinds of sugar-candy a higher temperature should be employed than for the lighter. The syrup is set to crystallize in a copper vessel with smooth sides, and contracted towards the bottom that the crystals may be easily removed. At the sides are several small rows of holes at equal heights, through which strings are passed which serve as nuclei to the crystals. The copper is filled up above the strings, and is then placed in a drying chamber at the temperature of from 104° to 122°. As the syrup cools and evaporates, solid crystals are slowly formed, partly on the surface, but chiefly on the strings and the sides The crystals on the surface are frequently broken up. In 6 or 8 days the crystallization is complete; the vessel is inverted, the syrup drains off, and when the dropping ceases the crystals are removed and dried.

Palm Sugars.—The various kinds of palms contain in their stems a juice charged with cane-sugar, which, in the fresh state, is named *toddy*, in India, and when fermented and distilled, *arrack*; it is by the evaporation of toddy that the sugar termed *jaggery* is obtained.—*See pages* 1771 and 1772.

The process from one of the palms, the coconut is thus described: a man named a "toddy-drawer" ascends the tree, cuts off the point of the spadix, and passes a ligature firmly round the stump. It is then beaten with a stick, which is supposed to determine the sap to the wounded part. The process is repeated for several days, a small portion of the end of the spadix being cut off each day. The juice soon begins to flow from the cut surface of the flower, and is carefully collected in an earthenware vessel suspended from the spathe. A thin portion of the flower and spathe is sliced off daily, and the end of the stump is bound with a ligature. A good healthy blossom will give from 2 to 4 pints English of sweet juice or *suri* daily, and some flowers will continue to yield juice for 4 or 5 weeks. There are frequently 2 spathes on one tree yielding suri at the same time, which by exposure to the air immediately begins to ferment, and forms the intoxicating liquor, *toddy*. By distillation, this juice yields about one-eighth part of arrack, of the same strength as good brandy. The seamen belonging to the Royal Navy in the Indian Seas, are furnished with it instead of rum. By allowing the juice to pass into the acetous fermentation, an excellent vinegar is obtained, in which a great variety of vegetables are pickled. Suri is the yeast commonly used by the bakers in Ceylon. In order to obtain sugar (*jaggery*) from suri instead of spirit, great care must be taken to prevent fermentation. The earthenware pot in which it falls is emptied twice or thrice in the course of 24 hours, and is well cleaned and dried each time ; a small quantity of lime is then thrown into it : the juice is filtered through the reticulated substance at the base of the leaf, and then slowly boiled in an earthenware vessel until it becomes light coloured and viscid. While still warm and semifluid, it is poured into sections of coco-nut shells, where it soon becomes solid. A gallon of juice yields about a pound of sugar. Jaggery contains both the crystallizable portion of the juice, and a quantity of molasses or liquid sugar ; but they are separated by a subsequent operation. This coarse sugar is usually made into small loaves of the shape of a hemispherical vase from the form of the vessel in which it cools. It has a deep chocolate colour, and when broken presents many clear particles of sugar. In the Malay language, jagery is called *goola* or *goora itan*, black sugar or black sweet. Jaggery is sold at the rate of about 2*d*. per pound. The Ryots, or peasants dependent on the land-owners in the East Indies, also cultivate the sugar-cane, express the juice, and boil it down to a thick syrup : they then transfer it to the Goldars, who produce the solid sugar. The crude syrup is named *goor*, and is of various qualities, one of which, in common use, is also called by the English settlers *jaggery*. There is an association of farmers, who convert the syrup and send the produce of each man's land to a common manufactory. Jaggery is sometimes adulterated with earth and sand. The colonists of Ceylon and India prepare refined sugar from jaggery : it is of a yellowish white colour : it is known in the English market under the name of *date-sugar*. A similar product from Africa is known as *date-sugar of Mojador* (the port of Morocco). See TODDY.

Manufacture of Rum.—The refuse of the sugar-cane is chiefly employed in the manufacture of rum The melasses, the skimmings from the clarifying and evaporating coppers, and even raw cane-juice diluted with water, are all used for this purpose ; *dunder*, or the wash of former operations, deprived of its alcohol by distillation, being used as a ferment. The fermentation is complete in from 5 to 7 days, and the liquor must be transferred to the still before the acetous fermentation shall have set in. A small portion of lime or of solid limestone is added to correct any acidity that may have formed. The spirit is allowed to flow through the worm until it is no longer inflammable. It is then rectified in a smaller still. Mr. Wray states that 1,200 gallons of wash yield 113 gallons of proof rum. Rum is coloured by means of caramel. Mr. Wray lays great stress on the action of the dunder. He terms it the aromatic substance which modifies the changes or transformations which take place during fermentation, that it increases the density of the liquor, and prevents violent fermentation ; that good dunder should be light, clear, slightly bitter, and quite free from acidity ; and that its action is similar to hops in diminishing the influence of decomposing azotised bodies, which is to convert alcohol into acetic acid.—*Tomlinson.*

Sugar, its impurities and adulterations.—As already noticed, two kinds of sugar have been particularly distinguished by chemists, viz., cane and grape sugar or glucose. The first is obtained from the sugar-cane, the beet-root, the maple tree and some other plants, while the second is contained in greater or less quantities in most fruits, and particularly in grapes and figs. Honey, although usually described as consisting of grape-sugar, contains a large quantity of crystallisable sugar resembling cane-sugar, and is therefore probably a mixture of two kinds. These two sugars differ considerably in many of their properties. Cane sugar consists of oxygen, hydrogen and carbon, in definite proportions ; it is crystallisable, the crystals are six sided oblique prisms, and when pure, not prone to deliquesce, or alter when exposed to moisture or a moderate temperature.

Grape sugar consists of the same elements, but contains a less proportion of carbon. Unlike cane-sugar its manufacture can be effected by art, that is by the action of the dilute mineral acids, particularly the sulphuric, on either starch or woody fibre : it has but little disposition to crystallise and when it does so the crystals assume no definite figure but are arranged in acicular tufts ; exposed to moisture or a moderate temperature it readily deliquesces.

Pure and unadulterated cane-sugar, should present a highly crystalline texture; should be of light colour and free from clamminess or moisture. These two sugars may be readily discriminated from each other by the action of certain tests and grape-sugar particularly by the copper and potassa tests. Now grape-sugar is frequently introduced for the purpose of adulteration.

On Vegetable Albumen in Cane-Sugar—Vegetables, like animals contain principles into the composition of which nitrogen largely enters : the chief of those is vegetable albumen.

Substances entirely different from sugar in their nature are but seldom employed in the adulteration of that commodity. The grocers having recourse to proceedings more natural and more difficult of detection, but scarcely less dishonest, than the introduction of foreign matters possessed of wholly different properties. The Mixing or Handling of sugar, consists in the mixing together, in various proportions, of sugars of different qualities and prices, none of which are very pure, and some highly impure: an article is thus prepared, presenting a tolerable appearance to the eye, but which is really one of very great impurity, and rarely what it professes to be, "real Jamaica," or "Demarara sugar," &c.

The impure sugars are dark-colored; imperfectly crystallised, heavy, and clammy, readily caking into masses: examined with the microscope they are found to contain fragments of cane, woody fibre, grit &c., and to abound with the acari and sporules of fungus. The raw or Muscovado sugar of the West Indies is of this nature, as well as, indeed, to a less extent nearly all the brown sugars imported into Great Britain. Now these inferior sugars are largely employed to mix with the whiter and drier sugars of the East Indies and the Mauritius, and are thus sold to the public.

Blood in sugar.—The employment of the blood of animals is confined to the manufacture of loaf sugar—but its use, we believe, is now very frequently dispensed with, even in the preparation of this article. The blood acts only through the albumen which it contains. One of the great difficulties of sugar-refining arose from the presence of vegetable albumen in the cane-juice, and here we have the apparent contradiction involved in the practice of putting albumen into the solution of sugar. The advantages derived from the use of this substance, we presume, are considered to more than counterbalance the disadvantages attending it and indeed it would appear that there is not the same difficulty in the removal of animal albumen as is experienced in the abstraction of vegetable albumen. The mode of its operation is as follows: the fluid albumen is diffused throughout the whole of the sugar solution to be clarified; on the application of heat the albumen immediately solidifies, and forms meshes and films, which being lighter than the water, ascend, and in their upward course carry with them the solid impurities contained in the solution, on the surface of which a scum is gradually formed, consisting of the impurities in question and the solidified albumen this scum may be removed by skimming. Now, as it is the albumen of the blood only which assists in clarifying the sugar-solution, and not the blood itself, it would be far better that albumen alone, as white of egg, should in all cases be employed. Blood is a fluid compounded of fibrin, albumen and a variety of salts and effete substances, its use, therefore, in the manufacture of lump sugar, is not merely disgusting, but is calculated to prove injurious to the health.

Acarus sacchari, or *sugar Insect.*—There is very commonly present in the more impure kinds of sugar, a beetle-like animalcule, of the genus Acarus.

The discovery of the very general presence of this acarus rests we believe entirely with Dr. Hassall. The sugar acarus approaches somewhat, in organisation and habits, the louse and the itch insect itself which are also included in the genus Acarus. The sugar mite is in size so considerable that it is plainly visible to the unaided sight. When present in sugar, it may always be detected by the following proceeding: two or three drachms or tea-spoonfuls of sugar should be dissolved in a large wine-glass of tepid water, and the solution allowed to remain at rest for an hour or so, at the end of that time, the animalcules will be found some on the surface of the liquid, some adhering to the sides of the glass, and others at the bottom mixed up with the copious and dark sediment, formed of fragments of cane, woody fibre, grit, dirt, and starch granules, which usually subsides on the solution of even a small quantity of sugar in water. We will now proceed to give a description of the acarus in question and observe in the first place that the whole of its development may be clearly traced out in almost every sample of brown sugar. The *Acarus sacchari* is first visible as a rounded body, or egg; this gradually enlarges and becomes elongated and cylindrical until it is about twice as long as broad; after a time, from the sides, and one extremity of this ovum, the legs and proboscis begin to protrude. The acarus thus far formed goes on increasing in size until it attains its full growth, when it is visible to the naked eye as a mere *speck*. Dr. Hassal gave the following, as the results of his Microscopical and Chemical Analyses of samples of Brown sugars, the produce of the different countries, noted below.

Madras.—Sugar dark, moist, staining the paper; somewhat crystalline, crystals small: contains fragments of cane; several acari, very few starch granules; grit, much grape-sugar and vegetable albumen.

Madras.—Contains a few pieces of cane; starch granules, much grit; several acari and ova; grape-sugar; albumen.

Mauritius.—Contains much cane; ten or twelve acari, of large size, several ova of same; a few starch granules; fragments of woody fibre; grit; much grape-sugar and albumen.

Mauritius.—Contains some cane; several acari, a few starch granules—those of arrowroot; grit; grape sugar and albumen.

Calcutta.—Sugar not very dark, dry, earthy looking, but few crystals apparent, and those very small, not much cane; a few starch granules; grit, no acari visible, grape sugar; albumen.

Calcutta.—Sugar perfectly white, dry, and highly crystalline, resembling crushed lump, a few starch granules, no acari, fungus, cane, or grit, scarcely a trace of grape-sugar or albumen.

Bombay.—Sugar exceeding dark colored, earthy and damp, contains some cane; a great many starch granules: (sago ?) numerous acari; much grape-sugar; albumen.

Cassipore, Calcutta.—Sugar pale straw-colour, dry and highly crystalline, large-grained, a very few species of cane, one small acarus, a few starch granules; scarcely a trace of albumen or grape-sugar; a little grit.

Cassipore, Calcutta.—Sugar pale straw colour, not very dry, fine-grained; the crystals being very small contains a few pieces of cane; starch granules, several acari of large size, much grit; a little grape-sugar and albumen.

Jamaica.—Sugar dark-brown not very dry, but still not staining the paper, tolerably large-grained and crystalline; contains much cane; several acari and ova of same, a few starch granules; no grit.

Rio de Janeiro.—Contains much cane, several acari and ova of same; a great many starch granules, like those of Indian corn; much grit; grape-sugar and vegetable albumen. On an attentive consideration of the above eleven analyses, it appears that only two of the sugars could be fairly regarded as pure, and in a condition fit for human consumption—the white, large grained Calcutta sugar, resembling crushed lump, and the pale straw-colored, large grained, highly crystalline, Cassipore sugar. Of these samples, that from Calcutta was by far the best. It would be a great advantage if the above described sugars could be introduced in large quantity into the country, and sold at moderate prices.—*Hassall.*

(7956) SUIDÆ. THE HOG TRIBE. Different Suidæ offer more or less variations in the length of the head. The Wild Boar (Sus Scrofa, Linn.) has the face longer and the skull less elevated; the domestic pig of Europe has the cranium slightly more elevated, and the face still sufficiently long: the Siamese Pig has the face shorter, the cranium more convex in the frontal region and larger in proportion. Dr. J. E. Gray makes the *Suina* a sub-family of the *Elephantidæ*. He includes in it the following species, of which specimens exists in the British Museum:—

Sus fasciatus, the Striped Boar.
S. Scrofa, the Boar.
S. Papuensis, the Bene,
S. Indicus, the Indian Wild Boar.
Babirussa Alfurus, the Babirussa.
Choiropotamus Africanus, the Bosch-Vark.
Phacochœrus Æthiopicus, the Valke-Vark, or Engallo.
P. Æliani, the Haruja, or Hallup.
Dicotyles Tajacu, the Peccary, or Tajacu.
D. labiatus, the Tagnicate.

We now proceed to give some account of the Asiatic forms.

(7957) *Sus Scrofa*, Linn., *S. Aper*, Briss, the Wild Boar, Le Sanglier of the French, The khanzeer, of the Arabs, the Junglie Soor of Hindustan; Dookur, Mah. Adave Pendie, Tel. is still an inhabitant of many of the temperate parts of Europe and Asia, but no longer exists in a natural state in the British Islands,

Dental Formula:—Incisors $\frac{6}{6}$; Canines, $\frac{1-1}{1-1}$; Molars, $\frac{7-7}{7-7}$ = 44

The Wild Boar harbours in the most solitary places in retired forests. His lair is generally in some wild and remote spot, not far from water, and commanding by some devious path access to the open country. The young, or Marcassins, as they are termed by the French, the Squeakers of the English in India, are striped with longitudinal bands. Throughout Europe the boar was long held in high estimation as a beast of chase. Nobles, princes and even kings, delighted to take the field with the boar-spear, and peril their persons in hunting this fierce animal. In England where it formerly rioted in the dense forests which have now vanished before the inroads of an increasing population, the loss of his eyes was the punishment inflicted by Willam the Conqueror on him who was convicted of killing a wild boar. In the vast forest which so late as Henry II.'s time stood on the north side of London, were stags, fallow-deer, wild boars, and bulls. In the 'Leges Wallicæ' it appears that Howel-dda gave permission to his grand huntsman to chase the boar from the middle of November to the beginning of December. In Europe, the boar-spear has given way to the rifle; but in India, hunting the wild-boar with the spear is still regarded as the most exciting of all the field sports of the English Officer there, and, perhaps, it is requisite once to see a Bombay Officer descending the tabular trap mountains of the Dekhan, in close pursuit of one of these fierce animals, to know what an Arab Horse and a British rider can do. The hunt of the Wild Boar in Western India, has been made the subject of song, and those alone who have seen or shared their sport can appreciate the proud but well earned exulting with which their poet comrade's song begins, and the consciousness as marked in its close, that the friendships acquired in the field in youth, will still be vivid in the memory at the decline of life. He sings

The Boar, the mighty Boar's my theme,
Whate'er the wise may say,
My morning thought, my midnight dream,
My hope throughout the day.
Youths daring spirit, manhood's fire,
Firm hand and eagle eye,
Must they require, who dare aspire,
To see the wild boar die,
Then pledge the Boar, the mighty Boar,
Fill high the cup with me,
Here's a health to all who fear no fall,
And the next grey Boar we see.

* * * *

When age hath weakened manhood's fire,
And every nerve unbraced
Those scenes of joy will still be ours,
In memory's tablet traced.
And with those friends whom death hath spared,
When life's wild course has run,
We'll talk of the dangers we have shared,
And the tusches we have won,
Then pledge the Boar the mighty Boar,
Fill high the cup with me,
Here's a health to all who fear no fall,
And the first grey Boar we see.

Throughout India, where the field is taken on horseback, the spear is still used, and hog-hunting is one of the most exciting of all the wild sports of this land of the sun. An attempt was made by Charles I. to restore this noble game to England, and he turned out several wild boars in the New Forest; but the civil wars were no friendly times for the experiment, and they were all destroyed. More recently General Howe procured some wild boars and sows from Germany, and turned them into the forests of Walmer and Alice Holt, or Ayles Holt, "to the great terror of the neighbourhood," as White says, in his 'History of Selborne;' "and, at one time, a wild bull or buffalo: but the country rose upon them, and destroyed them." The senses of the Hog are acute, especially that of smelling. The broad snout ploughs up the herbage; and not a root, an insect, or a worm, escapes the olfactory sense. If fairly treated, it is by no means a dirty animal; but it is too often styed up in its own filth. There are few more pleasing scenes in the farmyard than a well laid-out piggery properly kept. The animal itself is anything but stupid, and is capable of strong attachment where kindness is shown to it. That it is docile the number of learned pigs proves; and still more the famous sporting sow, that went regularly out with the gun, and stood for game as staunch as any pointer. It is said that the Hog is trained on the Continent to hunt for truffles.

(7958) *Babirusa*, F. Cuv.—F. Cuvier has separated this form from *Sus*.

(7959) *Babirussa Alfurus*, the Babirussa, *Sus Babirussa* of Linnæus; Le Babyrousa of Buffon; Le Sanglier des Indes Orientales of Brisson; and Le Cochon Cerf of Lesson and other French authors. The Babirussa stands high upon its rather slender legs. The skin which is of a grayish tint, inclining to fawn colour on the belly, is very thinly furnished with hair. The upper tusks come through the skin of the muzzle, and form nearly a circle directed backwards, often touching the skin again on their downward curvature. The females are smaller than the males, and are without these tusks. It still inhabits the marshy forests of the island of Bourou, and is said to be abundant in the Moluccas, and a few other islands of the Indian Archipelago. F. Cuvier has given very good figures, and a lively description of two males and females brought to France in the Astrolabe, and kept in the Paris Menagerie. The female was much younger and more active than the male, which was aged and very fat, and spent his short life in eating, drinking, and sleeping. The female bred once after her arrival in Europe. When the male retired to rest she would cover him completely over with litter, and then creep in under the straw to him, so that both were concealed from sight.

(7960) *Sus Papuensis*, the Bene of the natives of New Guinea, is described as being remarkable for its small stature and its agreeable and slender form. The canines of the upper jaw are very small, and nearly of the same form as the incisors; the bristles are rather thick, short, yellow, and brownish below, white above and annulated with black; the tail is very short. The young (Marcassins) are of a brown colour, more or less deep, with five rather bright fulvous stripes upon the back. The length of the Papuan Hog is three feet. It is common in the forests of New Guinea, and the Papuans highly esteem its flesh, which the French found excellent. The natives catch the young in the woods in order to rear them in a kind of domestication. M. Lesson remarks that the *S. Papuensis* has many points of analogy with the Peccaries, and seems to be intermediate between them and the True Hogs. —*Eng. Cyc.*

(7961) SUKUR KUND. CONVOLVULUS BATATAS. Sweet Potatoe.

Sukur kund, DUK.
Nutter Aloo, HIND.

A sweet-tasted nutritious root, of which there are two sorts, red and white. The tubers are long, and, when boiled or roasted, very wholesome. They are sown precisely in the same manner as a potatoe, after the hot season, and are fit to be taken up in six months. They sell from two to four pice a seer.—*Riddell.*

(7962) SULPHUR, BRIMSTONE.

Kibreet, cholok, ARAB.
Lew, CHIN.
Gundaka, CYNG.
Souffre, FR.
Blerong or balerang, MAL.
Gowgird, PERS.
Gandhaka, SANS.
Azufre, SP.

Schwefel, Ger.
Gunduck, Guz. Hind.
Zolfo, It.
Walerang, Jav.
Sanyaya, Tag.
Gendagum, Tam.
Ghendagum, Tel.

Sulphur (S=16), from *Sal*, salt, and πυξ, *fire* was employed in medicine by the Greeks, Arabs and Hindoos. It occurs in some animal substances, as albumen in Eggs, &c., in some plants, as in Cruciferæ, Umbelliferæ, Garlic, Fungi &c., but chiefly in the Mineral Kingdom; also combined as in gases or salts, in some minerals and mineral waters. It is frequently found in combination with metals, as in the common ores called Pyrites, the Sulphurets of Iron, of Copper, Lead, Mercury, &c., whence it is obtained by roasting, in England, Germany, Sweden, and at Cuddapah, in this country; the Sulphur, being volatilized, is collected in chambers. Native or Virgin Sulphur uncombined, is either a volcanic product, or occurs in beds in many parts of the world; that of commerce is brought chiefly from Italy, Sicily, and the adjacent islands, whence, in 1830, 246,338 cwt. of rough Sulphur were imported. It is afterwards purified by fusion, distillation, and sublimation, hence known under the names of Stick, Roll, Sublimed, and Flowers of Sulphur. Native Sulphur is purified by distilling it from earthen pots arranged in two rows on a large furnace. The Sulphur fuses and sublimes, and passes through a lateral tube in each pot into another place on the outside of the furnace, which is perforated near the bottom, to allow the melted Sulphur to flow into a pail containing water, where it congeals and forms *rough* or *crude* sulphur. This being redistilled, forms refined sulphur. When fused and cast into moulds, it forms *stick* or *roll* sulphur. Native Sulphur is found in acute octahedrons, and secondary to this form, with imperfect octahedral cleavage. It also occurs massive. The colour and streak of sulphur is yellow, sometimes orange-yellow; lustre vitreous. Transparent to translucent. Hardness 1-5 to 2-5. Specific gravity 2.07. It is easily distinguished by burning blue, and emitting a sulphur odour. The great repositories of sulphur are either beds of gypsum and the associated rocks, or the regions of active or extinct volcanoes. In the valley of Noto and Mazzaro in Sicily, at Conil near Cadiz in Spain, Bex in Switzerland, and Cracow in Poland, it occurs in the former situation. Sicily and the neighbouring volcanic islands, Vesuvius and the Solfatara in its vicinity, Iceland, Teneriffe, Java, Hawaii, New Zealand, Deception Island, and most active volcanic regions, afford more or less sulphur. The native sulphur of commerce is brought mostly from Sicily, where it occurs in beds along the central part of the south coast and to some distance inland. It is often associated with fine crystals of sulphate of strontian. It undergoes rough purification by fusion before exportation, which separates the earth and clay with which it occurs. Sixteen or seventeen thousand tons are annually imported from Sicily into England alone. Sulphur is also exported from the crater of Vulcano, one of the Lipari Islands, and from the Solfatara near Naples. It is also found in the United States of America, on the Potomac, and in districts where sulphuretted hydrogen is evolved from mineral-springs. Sulphuric Acid is said to occur in the waters of the Rio Vinagro in South America, also in Java, and at Lake de Taal in Luzon in the Eastern Islands. —*Eng. Cyc.* Sulphuric acid has been detected in the fumes of volcanoes. Sulphur undergoes no alteration in the air at common temperatures. That of commerce, obtained from Pyrites, is often contaminated by metallic impurities, as Zinc Carbonate and Sulphate, Iron Oxide and Sulphuret, Arsenic, the Sulphuret, Silica, Magnesia, Alumina, and Carbonate of Lime. Flowers of Sulphur are sometimes contaminated by the presence of a minute quantity of Sulphurous (stated by some to be Sulphuric) Acid, formed by a portion of the Sulphur during sublimation uniting with the Oxygen in the apparatus. It should be freed from acidity by washing with hotwater, when it should not affect Litmus paper. —*Royle.*

(7963) *In Tenasserim*, *Sulphur* only exists in the ores that are found in the form of sulphurets, as the sulphuret of iron, the sulphuret of antimony, the sulphuret of lead, and the sulphuret of copper; but native sulphur has not been found in the Provinces.—*Mason.* The *Sulphur* from Canara and Nellore is of fair quality, and in pure though small crystals. This substance is found in small quantities, in several districts of the Madras Presidency, as Salem, Masulipatam, Guntoor, Cuddapah and Trichinopoly; it occurs along with Gypsum in marl and clay beds, and also very largely in the form of metallic sulphurets. The natives are acquainted with the modes of subliming sulphur, and they prepare it of indifferent quality for the manufacture of the gunpowder, which is used for Engineering purposes, &c. *M. E. J. R.*—This would appear to be a very rare production in India, we are told that about thirty miles north of Andipore in Upper Hindoostan, it is met with, but of a quality inferior to that brought from the Gulph of Cutch and Persia. Dr. Heyne tells us, in his Tracts Historical and Statistical of India (p. 186, 187), that he met with sulphur in small heaps and in tolerable abundance, at the Northern extremity of a lake which is near a small Village called Soorasany yanam, about 12 miles east from Aumlapore, and not far from Maddepolem. It was in a loose soft form, or in nodules of a greyish yellow color. The greater part of the Sulphur, which is exposed for sale in the Indian provinces, is brought from Muscat, from Sumatra, or from the Banda island called Gonangapi, where it is a volcanic production. In China, Dr.

Abel, had some most beautiful and splendid native sulphur brought to him from the crater of Gunang Karang. We know that it is a product of the Philippine islands particularly in the island of Zeyti, whence the gunpowder works of Manilla are supplied: most of the sulphur brought to Hindoostan contains a considerable portion of orpiment, being much less pure than either that which is dug out of the solfaterra near Naples, or that imported from Sicily, which last, Dr. Thomson says, contains seldom more of impurity than about three per cent of a simple earth A bright shining yellow sulphur is sold in the bazars of lower India under the name of Nellikoya gundagum (Tam.) By Dr. F. Hamilton's excellent account of Nepaul, p. 78, it appears that Sulphur is there numerous: this useful article is also found in Persia in mountains behind Takran and in mountains south of Kelat in the province of Mekran. It is met with in Cabul in the District of Balkh, it is also a product of Armenia, of Moultan, of China and Thibet; also, according to Morier, at Balianlia in Persia in the District of Kabul. With regard to the Indian Islands, Mr. Crawfurd in his history of the Indian Archipelago says (Vol. I. p. 201,202) that sulphur is found in all the pseudo volcanoes of these islands in great purity, but that the manufacture of gunpowder amongst the Malays is very imperfect. Sulphur would not appear to be found in great abundance in our Indian dominions: In the district of Oudipour in upper India, it is to be met with, but of a quality inferior to that which is brought from the gulphs of Cutch and Persia. In Travancore it has, I understand, says Ainslie, been discovered by the ingenious and indefatigable Captain Arthur, of the corps of Engineers, in combination with Iron, in the form of Pyrites, and also in combination with Alum. In Cotiole (in Canara) too, I am told, it may be procured. The greater part of the sulphur, however, exposed for sale in the Madras provinces, was in Ainslie's time brought from Muscat, from Sumatra, or from the Banda island Gonang-Api. Sonnerat tells us that it is common at Pegu, and we know it also to be a product of the Philippine islands.—*Ains. Mat. Med. p. 45.* Sulphur is in the Malay balirang, and in Javanese wálirang, essentially the same word. This name extends from Sumatra up to Celebes, where we find a new one for it, cholok. In one of the languages of the Philippines, the Tagala, strangely enough, the name is sanyaya, which is, no doubt, a corruption of the Malayan word sandawa, saltpetre. In the Bisaya, as well as in the Tagala, the name for gunpowder is maliling, doubtless a corruption of the Malay and Javanese name for sulphur. In the Madagascar, the name for it is sulifara, a corruption of the French soufre, from which it may be safely inferred that the article was unknown to the natives of this non-volcanic island until brough to their knowledge by Europeans. It is hard to say to what use the natives of the Malay Archipelago could have put sulphur, before the introduction of fire arms, unless to the manufacture of fire-works, known by the native names of marchun and rabok. The Malay and Philippine Archipelagos, the most extensive volcanic region in the world, must necessarily contain a vast supply of sulphur, but hitherto it has been very little availed of for economic use. From the Philippines alone it is exported, the export being to China only, and at the price at Manilla usually of about a Spanish dollar of 4s. 2d. a cwt. Among these islands, those which most abound in it are Luzon and Leyte, but particularly the last, where the article is of the best quality. A spanish writer asserts that the quantity is such at the volcana of Taal. or Bombon, in the province of Botengas in Luzon, that many ships might be loaded with it. The difficulty, in all these cases, of obtaining a cheap supply, must arise from the absence of good roads, and the consequent costliness of transport.—*Crawfurd Dict. page* 412.

(7964) SULPHURIC ACID, OIL OF VITRIOL, VITROLIC ACID, SPIRITS OF VITRIOL.

Rohazim Maulkibrit. ARAB.
Gandaka rasa, CYNG.
Acide Sulfurique, FR.
Acidum Sulphuricum, LAT.
Gunduck-ka teil GUZ.
Gunduc kateil, HIND.
Schwefel-saure, GER.
Arika-Gowgird, PERS.
Ghendaga Travagum, TAM.

Sulphuric Acid (S. or $SO_3 = 40$) is one of the most important compounds of Chemistry. This acid is produced in small quantities in nature, as near volcanoes, in some acid springs, and exists in combination in numerous Sulphates, especially those of Lime (*Gypsum*) and of Magnesia, found as minerals, or in the water of springs. It was known to the Arabs, Persians, and Hindoos. Sulphuric Acid appears, from its name, to have been originally made in Europe, and probably also in Persia, from the decomposition of Vitriol or Sulphate of Iron, a practice still followed at Nordhausen in Saxony. The Sulphate is first calcined, so as to expel nearly the whole of the water (of crystallization) it contains. The acid, distilled off in an earthenware retort at a red heat, comes over in vapours, which condense into a dark-coloured oily-looking liquid. This fumes when exposed to the air, and contains less than 1 Eq. of Water to 2 of Sulphuric Acid, has a Sp. Gr. of 1·9, and is known in commerce as the Nordhausen, Fuming, or Glacial Sulphuric Acid.

The Acid of the Colleges, *Acidum Sulphuricum*, L.E. Sulphuric Acid. ACIDUM SULPHURICUM VENALE, D. Oil of Vitriol *Vitriolic Acid. Spirit of Vitriol. Prop.* Liquid Sulphuric Acid, (S, Sul or $SO_3\ HO = 49$) is a dense oily-looking liquid, usually colourless, devoid of smell, but intensely acid, and powerfully corrosive. At first it feels oily, from destroying the cuticle, but soon acts as a caustic, charring both animal and vegetable substances by combining with the water and setting free the carbon. It freezes at from —15° to —29°, according to its density, and boils at 620° F. Its affinity for water is great, heat and condensation being produced on their union. It may be diluted with it to any extent. It unites with alkalis, earths, and metallic oxides, rapidly dissolving some metals, as iron and Zinc, when diluted with water. By the action of S. Acid on alcohol, Ether is produced.

Sulphuric acid used to be made in England by burning the imported Sulphur with a little Nitre. After the great increase which took place in the price of Sulphur, some manufacturers employed that obtained from Pyrites, which often contains Arsenic as an impurity. The proportion of Nitre was $\frac{1}{9}$ which was burnt with Sulphur either in the same chamber, lined with lead, and having its bottom covered with water, or in a furnace, from whence the vapours produced were conveyed into a similar chamber. The mode of making Sulphuric acid now varies from the above in many places, and has been described by Professor Graham. In this process Sulphurous Acid, from burning Sulphur, Nitric Acid vapour, and steam, are simultaneously admitted into oblong leaden chambers, so partitioned that the vapours can only advance slowly, and thus allow the whole of the Sulphuric Acid to be deposited.—*Royle.*

(7965) SUMACH, Shumac. See Rhus, also Shumac.

Tumtum Arab.
Sumac, Fr.
Schmack, Ger.
Sommaco, It.
Sumak, Pers.

(7966) SUMBUL ROOT. The Sumbul root, which has recently been introduced into the French market, is the root of an umbelliferous plant, which is characterised by a strong odour of musk. The pilgrims, on their return from Mecca, generally import to Salonika, Constantinople, &c. among other articles of trade, various plants with a musk like odour. The preparation of these vegetable substances is said to be effected by smearing them over with musk-balsam.—*Simmonds' Comml. Products, p.* 648.

(7967) SUMUNDUR JUG. Sumuudr-phen. Bone of the cuttle fish, considered refrigerant used in eye ointments; also in mesalihs.—*Genl. Med. Top. p.* 150.

(7968) SUN-FLOWER, the English name of a genus of Plants called *Helianthus* from ἥλιος, the sun, and ἄνθος, a flower. Two reasons have been assigned for giving the plants of this genus this name: first, the resemblance of the large disc and ray of their flowers to the sun; and second, the tendency of these flowers, in a stronger degree than in other plants, to present their face to the sun. From this circumstance, the French Tournesol, Italian Girasole, and English Turnsol have been given. This is a genus consisting of very stately herbaceous plants, and containing upwards of 40 species, all of which are indigenous to America. It belongs to the natural order *Compositæ*, and has the following characters:—Head composed of many flowers, the flowers of the ray being ligulate and neuter, the flowers of the disc tubular and hermaphrodite; involucre irregularly imbricated, the outer scales foliaceous, the inner ones scaly; receptacle plane or convex, covered with oblong acute scales; tube of the corolla of discoid flowers short, 5-toothed; style appendiculated. Fruit an achenium compressed laterally; pappus in the form of two lanceolate acute deciduous scales. The leaves are opposite, sometimes superiorly alternate, and either entire or toothed. The whole plant is scabrous or villous. The flowers are solitary, and of a yellow orange colour.

Helianthus annuus, Annual Sun-Flower, is an herbaceous annual plant with thick rough stems from 6 to 20 feet in height; leaves alternate, petiolate, nearly heart-shaped, crenulated or dentated, rough. The heads are large, from one to two feet in diameter, and composed of a multitude of flowers of a beautiful yellow colour, terminal, solitary, inclined, the disc vertical and oftenest facing the south. This species is the largest of the genus. It is indigenous in Mexico and Peru; it was early introduced into Europe after the discovery of America, and has since been very generally cultivated in gardens, on account of its very large and handsome yellow flowers. The plant however in Europe never attains the height nor the flowers the size they do in their native soil and climate. The albumen of the seeds of this plant contains a large quantity of oil; and it has been proposed to cultivate it for the sake of obtaining this oil, which is very palatable, and might be used for the table. Cows and oxen, horses, sheep, pigs, rabbits, and poultry are all fond of it. When torrified in the same manner as the seeds of coffee they make an agreeable drink, which may be used as a substitute for that article. *H. multiflorus*, Many-Flowered sun-Flower, is not so high a plant as the last, nor are its flowers so large. It has vivacious roots, which produce numerous herbaceous stems, which are branched and rough; its leaves are alternate, petiolate, dentated, the inferior ones are heart shaped, the superior oval and acuminate; the heads of flowers are numerous and not inclined. It is a native of Virginia.

Helianthus tuberosus, Tuberous Sun-Flower, or Jerusalem Artichoke. This latter name is a barbarous corruption of the Italian Girasole, this species having been introduced into Europe at the Farnese Garden at Rome, whence it was originally distributed. The roots are composed of a number of oblong tubercles, very large and fleshy, reddish outside and white within, resembling a potato; the stems are herbaceous and upright; the leaves are alternate and opposite, petiolate oval, rough; the heads of flowers are yellow, and small compared with the two preceding species. It is a native of Brazil. In France it is also known by the name of Topinambour and Porire de Terre. According to Braconnot and Payen, the tubers do not contain fecula, but a vegetable principle called Inulin, or Dahlin. These tubers, when cooked, form a good substitute for potatoes, and by some are even preferred.

Some of the species secrete a resinous juice, which is found to exude from the various organs of the plant. This is most observable in the *H. thurifer*, in which the resinous matter runs down the stem. This is sometimes observed to occur in the flowers of *H. annuus*. The *H. Indicus* of Linnæus and our gardens is probably only a variety of *H. annuus*, and is not a native of India, as its name would imply. This last species, according to Dr. Royle, is cultivated by the natives of India for the purpose of obtaining oil from its seeds.—*Eng. Cyc.*

(7969) SUN ROSE. Helianthemum.

(7970) SUNG-I-BUSRA is an officinal article at Lahore. It is a compound earthy mass of a greyish color, occasionally varying (from the different composition or manipulation) sometimes it is to be met with in small pieces, at other times in a tubular form, as thick as a finger. Whether its name, "basree" be from Bassora, or from vision, as formerly the lapis divinus was used is not known. It is certain that no Zinc is in it. But in Ainslie's Mat. Indica, *Vol.* 1, *p.* 573, Sung busric is erroneously stated to be Zinc. According to the analysis made by the Professor of Chemistry, Dr. Joseph Redtenbacher, in the Chemical Laboratory at the Thersianum in Vienna, the constituent parts of this compound are: clay, magnesia, silica, and oxyde of iron. It is probably, prepared from Diorite, the analysis of which showed the same ingredients. Sung-e-Busree (1) proved an excellent remedy in the cholera epidemy at Lahore, in 1835.—*Thirty five years in the East, by Dr. Honig. p.* 351.

(7971) SUNG DIRAN. An impure and weak Nitro-muriatic acid, made by attars by mixing equal parts of alum, nitre and salt with a little water in an earthen pot (gurra,) and distilling; an acid fluid comes over that is applied to cure herpetic eruptions.—*Genl. Med. Top. p.* 152.

(7972) SUNG-I-MISRE A red and white stone, imported via Pali, is used as an aphrodisiac: one tola for one anna.—*Genl. Med. Top. p.* 152.

(7973) SUNG SURMIYA. A concretion from the head of a fish comes from Delhi, used as an aphrodisiac. Sold at eight annas a tola. —*Genl. Med. Top. p.* 152.

(7974) SUNN. Brown Hemp, Salset
Hemp.

Sunn, Guz. Hind.
Janapa also Shanapa, Tam.
Wucko nar, Mal.
Concanee, Tag.
Ghore Sunn also Mœsta p
Beng.
Kenna, Cyng.

See Crotalaria.

(7975) SUR. A Sind grass, perhaps Arun kurka: its flower stalks are beaten into firm brcs called Moonyah, from which string or twi is fabricated.

(7976) SUTHERLANDIA GRANDIFLOR Leguminosæ.—This is a pretty shrub wi scarlet flowers, native of the Cape, and is readi increased by seed in any good garden soil.- *Riddell.*

(7977) SUWARROW NUTS, Saoua Nuts. Are a species of butter nuts or Berrie the produce of a large tree (*Caryocar raciferum* which grows in Guiana.

(7978) SWAINSONIA GALEGÆFOLI Leguminosæ. This is a pretty species shrub with purple, red and white flowers grow from seed in good garden soil.—*Eng Cyc.*

(7979) SWALLOW-HAWK. [Falconidæ

(7980) SWALLOW TRIBE, *Hirundinidæ*, family of Insectivorous Birds, in which th powers of flight are very highly developed, bu which have the feet comparatively weak.

Hirundo esculenta, is the Swallow which mak the edible nests that form a considerable artic of Chinese commerce. The species, which is th Lawet of the Javanese, is small. It is brow above, and whitish beneath and at the end the tail, which last is forked. The nests a by some said to be made of a particul species of *Fucus* [Algæ] which the bi macerates and bruises before it employs th material in layers so as to form the whitis gelatinous cup-shaped nests so highly prized delicacies and restoratives by the Chinese wh dissolved in their soups. Bontius, who seen to have thought that the nest was formed of vegetable material, says of these birds, "e spuma maris basin scopulorum alluentis, ten cem quandam materiam colligunt, sive ea Bala narum seu aliorum piscium sit semen, ex qu nidos suos ædificant, in iisque ova ponunt, pullos excludunt." The nests are affixed to th rocks, and the finest are semi-transparen Coarse or dirty nests are used for glue, but th good ones are eagerly sought after. "Chinens hos nidos e scopulis avulsos, ingenti quantitat per Indiam venales ferunt, gulosis in summa delicias, qui oos gallinæ, sue vervesis decoct disolutos, avide devorant, et ostreis, fungis e cæteris gulæ irritamentis, longe anteponunt. This recipe for making the famous birds' nes soup ends a chapter which begins poetically and pathetically with the following lines :—

> “ Quid scopulos, Progne, quid inhospita littora nidis
> Optas, per medias hos gula quæret aquas ?”

(7981) *Hirundo fuciphaga.* There is another species, *H. fuciphaga*, the Linchi of the Javanese, about five inches long, nearly an inch shorter than *H. esculenta*, which has a white abdomen and longer wings in proportion to its size. This species constructs its nest of mosses and lichen connected by the same glutinous substance which composes the edible nest of *H. esculenta*. Dr. Horsfield, who states this in his ‘ Systematic Arrangement and Description of Birds from the Island of Java’ ‘ Linn. Trans., vol., xiii.), there remarks that he specimens of *H. esculenta* examined by him n Java and those which he brought home differ rom Latham's description in being uniformly of a blackish-colour without a white extremity to he rectrices. Bontius, who gives a rude cut f the nests adhering to the rock, with the birds itting and approaching, describes his birds, in he chapter ‘ De nidis hirundinum edulibus,’ bove referred to, as ‘ Aviculæ parvæ discolores, irundinum specie.’ Specimens of *H. esculenta* nd *H. fuciphaga* are preserved in the Museum f the East India Company.

(7982) *Macropteryx.*—Tarsus remarkably hort, naked. Anterior toes long ; the outer carcely shorter than the middle ; the inner shortest ; hinder toe very short. Tail long, forked. It s a native of India. (Swainson).

Macropteryx longipennis.—Above obscure lossy-green ; throat, breast, and lower part of he back, light-gray ; belly, spot on the scapulars, and line over the eye, white ; ears rufous ; ront with an incumbent crest. Mr. Swainson onsiders *Macropteryx* intermediate between the ypical Swifts and the Swallows. To the first, e remarks, it is allied by its strong scansorial ect ; to the latter by the length and fixed position of the hind toe, and the depression of the ill. The Wood-Swallows of Australia and India re not, though closely related to, the *Hirundinidæ*, but differ in the structure of their bills and et. Mr. G. R. Gray arranges them under his ub-family *Dicrurinæ* amongst the *Ampelidæ*. hey belong to the genus *Artamus*, which is ften placed in the *Laniadæ*, and is thus defined : —Bill gradually arched from the base, where it s very broad. Culmen thick and convex without any ridge ; the base dividing the frontal feathers, and somewhat dilated. Rictus bristled. Nostrils wide apart, naked, small without a membrane, and pierced in the bill. Feet short, trong. Wings very long and pointed ; the first uill longest. Tail short. (Swainson.)

(7983) *Artamus leucorhynchos* is the *Lanius leucorhynchos* of Gmelin, Pigreische Dominiquaine e Philippines of Sonnerat, and White-Bellied Shrike of Latham. Size rather larger than a sparrow, and in shape much more elongated. Head, neck, breast, back, wings, and tail black. Belly and upper part of the rump white. Under part of the wings (which are very long, and reach at least an inch beyond the tail) gray. Bill grayish, conical, and very strong, slightly curved at its extremity, and its base surrounded with stiff bristles directed forwards. Legs black. Sonnerat states that this bird flies with rapidity, poising itself in the air like the swallows. It is, he adds, an enemy to the crow ; and although much smaller, the wood-swallow not only dares to oppose but to provoke him. The combat is long and stubborn, sometimes continuing for half and hour, and concludes with the retreat of the crow. Perhaps, says Sonnerat, the crow despises this too feeble enemy, which only harasses him, and avoids his strokes by his activity, darting away, returning as he sees his opportunity.—*Eng. Cyc.*

(7984) SWEET BRIAR. Rosa rubiginosa.

(7985) SWEET FLAG, ANDROPOGON CALAMUS AROMATICUS. Sweet Calamus.

Kist-ul-durrera, Wuj, ARAB.
Shwet Buch, BENG.
Bagy, CAN.
Tachxudogbo, COCH CHIN.
Wadda-kaha, CYNG.
Buch. DUK.
Acorus odoraut, FR.
Kalmis Wurtzel. GER.
Kussub-bewa, Godavuz, Venkund, Wuj Igir, GUZ. HIND.
Calamo aramatico, IT.
Kawa-sob, JAP.
Calamus aromaticus, LAT.
Vudge, PERS.
Dringo, PORT.
Vacha, Godavuz, Venkund, Haimavati, Golomi, SANS.
Vassambo, TAM.
Vudza, TEL.

Sweet Calamus, the aromatic, which was of equal celebrity with Spikenard, mentioned by the same authors, and procured from the same country, is described by Dioscorides under the name of Κάλαμος ἀρωματικος. It is supposed by Sprengel and some authors that the *Acorus Calamus* of botanists is intended, which is possessed of slight aromatic properties, is common in European ditches, and is likewise found in India in mountainous situations. This is known to the Arabs by the name Wuj, which appears to be a corruption of the Hindoo Buch, Sanscrit Vacha, and has in the Arabian works the name Akoron assigned as its Greek synonyme, no doubt intended for the Ακορον of Dioscorides. Therefore there is no foundation for the opinion of Sprengel that this Acoron is the *Iris pseudacorus* of botanists.

Calamus aromaticus is described by Dioscorides immediately after Σχοῖνος, or Σχῖνος, which is usually translated *Juncus odoratus*, and is acknowledged to be the *Andropogon Schœnanthus* of botanists, commonly known by the name of Lemon-Grass. This has also had the names of Camel's Hay, Palea de Mecha, &c., applied to it. *Schœnanthus* is evidently compounded of ‘ schœnus’ and ‘ anthos’ (ἄνθος, ‘ a flower,’). Theophrastus treats of Calamos and Schœnos together, and states that they were found among the mountains of Libanus, on the shores of an extensive lake ; but

Burckhard in such situations could only find rushes and reeds. It is possible therefore that a Syrian locality may have been assigned to drugs obtained from more distant countries by the route of the Euphrates, for Dioscorides says they are produced in India. By Hippocrates they are called Κάλαμος εὐώδης and Σχοῖνος εὔοσμος, also Κάλαμος σχοῖνος)Hipp., f. 5 p. 138, l. 17), evidently showing that if they agreed in properties, they had also some resemblance in nature. If we desire to find something similar to *Schænanthus*, and possessed of still more aromatic properties, we have only to search in the genus to which this belongs, and we shall find several plants famous for their agreeable odour. The roots of *Andropogon muricatum*, commonly known in the shops of Britain by the Tamul name Vitivayr and made into small bundles for brushing velvet, are remarkable for their fragrance: hence several essences are now prepared from them in Paris. The roots are also well known in India by the name of Khus-khus, being used throughout the several Presidencies for making tattees; these thatched screens being fitted to doors and windows, have water constantly sprinkled over them; the hot air in passing through becomes much cooled by the great evaporation, and enters the room both cool and refreshing, diffusing a delightful fragrance. The aroma here depends on the presence of a principle analogous to myrrh. But other species are still more fragrant, and secrete odorous volatile oil in sufficiently large quantities to be profitably distilled. Of these, Lemon-Grass, or *Andropogon Schænanthus*, is the best known. The infusion of its leaves is often employed in India as a pleasant stomachic, and Lemon-Grass Oil is probably distilled from them. *A. Nardus* (?) is another species, called Ginger or Spice-Grass, by Ainslie, which is said by him to be common in the Courtallum Hills and the Indian Peninsula, where the natives occasionally prepare with it an essential oil useful in rheumatism, and use the infusion of its leaves as a stomachic. *A. Iwarancusha* is a species which comes near *A. Schænanthus* in habit and taste. It skirts the bases of the mountains of north-west India, and was found by Dr. Blane and by Dr. Boyd about Hurdwar: it was considered by the former to be the Spikenard of the ancients. Dr. Royle also found it near Hurdwar, and in the upper parts of the Doab of the Ganges and Jumna rivers, and he states (' Illustra. Himal. Bot.' p. 425) that it is there called Mirchiagund, with Izkhir given as its Arabic, and Iskhinos as its Greek synonym; and infers that it may have been the Σχινος of the Greeks as well as *A. Schænanthus*. But another species is still more extensively diffused, and still more remarkable for its very powerful and delightful fragrance. This is the species which yields the Grass-Oil of central India, commonly called Oil of Spikenard. It extends southward to between the Godavery and Nagpore, and northward to the Delhi territory, but probably still farther north, as it delights in a dry and barren soil. In central India, especially at Namur, Ellichpore, &c., a very delightful fragrant oil is distilled from this plant, which is highly valued in the East as a scent, being added to the finer expressed oils employed for anointing the hair or the bodies of the natives. It is also much esteemed as an external application in rheumatism, and has been introduced into practice in England, and is highly valued by some, though unknown to the generality of practitioners. It has the advantage of diffusing an agreeable odour at the same time that it is efficacious as a stimulant remedy. This or the preceding species extends into Afghanistan. Sweet Cane, or Calamus, being described by Dioscoride immediately after Σχῖνος, which is generally acknowledged to be *A. Schænanthus*, appears to Dr. Royle to belong to the same genus, and indeed to be the above far-famed species, as *Calamus aromaticus* is thought also to be the Sweet-Cane and the rich aromatic reed from 'a far country' of Scripture. He states that there is no plant which more closely coincides in description with everything that is required than the tall grass which yields the fragrant Grass-Oil of central India, and which he has named *Andropogon Calamus aromaticus*. (' Illust. Himal. Botany,' p. 425.)

(7986) SWEET PEA. Lathyrus.

(7987) SWEET SULTAN. Centaurea.

(7988) SWEET WILLIAM, Dianthus.

(7989) SWIETENIA, a small genus of plants of the natural family *Cedrilaceæ* named by Jacquin in honour of G. van Swieten. The genus *Swietenia* is characterised by having a small 4-5-cleft calyx; petals 4 to 5, deciduous; stamens 8 to 10, the filaments united together into a toothed tube, bearing the anthers on the inside: stigma peltate; ovary 5-celled, seated on a stipes; seeds winged. The species, though few in number are found in the hot parts of the world, form large trees, and yield valuable timber.—*Eng. Cyc.*

(7990) SWIETENIA CHICKRASSA. CHITTAGONG WOOD.

Nga-bagi, BURM. | Chickrassa, HIND.

S. Chickrassa, is now formed into a new genus, Chickrassia tabularis. This Indian tree is greatly admired for its beauty. The wood is very light coloured, close grained and most elegantly veined and much employed for furniture, and cabinet work.—*Eng. Cyc.* It grows in abundance in the Chittagong woods, and is much esteemed by the Cabinet makers as being little inferior to its congener, the Swietenia Mahogani (Willd.).—*Ains. Mat. Med. p.* 210. It is found along with Teak in the Pegu districts, but it is not very plentiful: wood, red; equivalent to mahogany.—*McClelland.*

(7991) SWIETENIA CHLOROXYLON. *Syn.* CHLOROXYLON SWIETENIA. *Cedrelaceæ*, Ill. 56 bis. Satin wood tree.

Billoo Kara, TEL.
Velva Maram also Moodoodi, TAM.
Kodawah porsh, TAM.
Boorooeh gaka, CYNG.
Dhoura, HIND.

S. chloroxylon is another species, which has been formed into a new genus, and is now *Chloroxylon Swietenia.*

It is the tree yielding the beautiful East Indian satin wood, which is of a deep yellow colour close grained, heavy and durable.—*Eng. Cyc.* This chiefly Ceylon tree grows abundantly in the mountainous districts of the Madras Presidency, in the Jungles of Goozerat and the Deccan, but seldom attains a large size. Occasionally planks of 10 to 15 inches in breadth may be procured. The wood is very close grained, hard and durable, of a light orange colour, takes a fine polish, and is suited for all kinds of ornamental work, but is somewhat apt to split. For picture frames, it is nearly equal to American maple. The timber bears submersion well. In some instances it is beautifully feathered but it has the peculiarity of losing its beauty by age, unless protected by a coat of fine varnish.—*M. E. J. R.* The Billu Kara of the Circars, says M. Rohdes, is a most serviceable hard wood, well suited for naves of wheels and, were it procurable in any quantity, for all frame work requiring strength and durability. In Ceylon, the Peradenia bridge, a single arch of 205 feet on the road to Kandy, was designed and principally executed in this wood : it s chiefly procured in the jungles on the Eastern side of Ceylon where it attains a diameter of 18 nches of sound wood. The flowered or feathered Satin wood when first polished is one of the most beautiful woods in the world. Mr. Rohde has seen specimens surpassingly beautiful, these ogs are not distinguishable from ordinary satin wood till sawn, and twenty or forty may be cut without one of any beauty being found. The fea-hered satin wood seems very liable to sever when dry and old ; articles of satin wood get darker and lose much of their beauty by age, unless protracted by a coat of fine varnish.—*Rohdes.* Though satin wood is highly esteemed n Ceylon, where it attains a large size, until very lately Dr. Wight had never seen it exceed good sized shrub in India. Planks have since been obtained 15 inches broad from the Animullay Forests. In Ceylon where it is abundant and well known, it is very highly esteemed, and their hell boxes are made of it.—*Wight.* An essential il is found in *Chloroxylon Swietenia.*

(7992) SWIETENIA FEBRIFUGA of Rox-urgh has been formed into a new genus, *Soymida.* [SOYMIDA.]—*Eng. Cyc.*

(7993) SWIETENIA MAHOGANI. MAHOGANY TREE. Indigenous in South America, and aturalized in some parts of India. The bark is used in the West Indies as a substitute for cinchona. It is very astringent, but contains no alkaline principle, and is not used by European practitioners.—*O'Shaughnessy, page* 248. This is the most important species, and, from the removal of the others to separate genera, now nearly alone constitutes the genus : is a native of Compeachy and of the West Indies. It is a lofty branching tree with a large spreading head, and pinnate shining leaves. The timber which is so well known from its extensive employment for furniture and cabinet making is of a reddish or yellowish brown colour, of different degrees of brightness, much mottled and streaked, very little liable to shrink or warp, free from taste or smell, except when kept for some time, when it acquires an agreeable odour from the exudation of a semi-resinous juice which serves to preserve the wood from the attacks of insects. It does not appear to have been imported into great Britain before 1724. The quality of the wood varies much according to the situations in which it grows, that which is produced on rocky soil and exposed situations is the best. Spanish mahogany is imported into England, in logs of about 10 feet long and from 20 to 26 inches square. From the elevated parts of the West Indies and from the Spanish Main the wood is close-grained and of a darker colour than the Honduras Mahogany. This is imported in logs of from 2 to 4 feet square though both kinds are no doubt produced by the same tree. Some years ago the Messrs. Broadwood gave the large sum of £ 3000 for three logs of Mahogany, which were each about 15 feet long and 38 inches square. The wood was extremely beautiful and capable of taking the highest polish.—*Eng. Cyc.* See MAHOGANY.

(7994) SYLHET, possesses a few manufactures. The Natives there excel in some kinds ivory work. They manufacture a variety of articles, including Ladies' Bonnets. They also make shields of Buffalo and Rhinoceros' hides, which are celebrated throughout India for their durability and polish. The varnish is made of the juice of the Semecarpus anacardium (or Indian marking nut,) which has already attracted attention. One description of target called *afla-o-i*, which is made here, is not varnished but is rendered by some peculiar process of preparing the leather, semi-transparent. The otter skins of the District are an article of traffic, and would bear a comparison with similar furs in Europe. Considerable quantities of them are prepared annually both here and in Mymensing. They were formerly sent to Thibet, but they are now chiefly exported to China. The other manufactures for which Sylhet is famed, are sword handles, morahs, articles of brass work (made at Toroff,) and fine "sectalpatee" mats, such as are commonly used in Bengal, for covering the seats of chairs, beds, and couches. This place has, also, long been celebrated for the preparation of certain perfumes, as the attars of *uggur* or lign aloe, and *naugissore* (Mesua ferrea) ; also several compounds of essential oils, of which that of Cassia is one of the principal ingredients, the tree (Aquilaria agallocha. Roxb.), which yields the lign aloe, grows in the Naga country between Sylhet and Assam, also in Cochin China and Siam. Both the wood and the essence extracted from it at Sylhet, are purchased by Mogul merchants for exportation to Bassora, and other Mahomedan countries, where they are held in high estimation and much used, the attar, as a perfume, and the wood, for fumigating apartments and cloths. Lign aloe is interesting from its antiquity as an export from India, being an article that was formerly much used as incense in Western Asia. It is mentioned under the name of *agallochum* in Scripture.—*Dr. Taylor.* Amongst the articles of export, are a variety of particoloured cloths, generally known by the name of Sylhet cloths. Some of them are dyed of rich colours, and being of a strong durable texture, are well adapted for table covers, to which purpose they are usually applied in the Eastern part of Bengal.

(7995) SYMPHOREMA. Of this genus, Wight in Icones, gives involucratum, 362 ; polyandrum, 363 ; and *polyandrum*, 1474.

(7996) SYMPHOREMA INVOLUCRATA. VERBENACEÆ, A species of St. Peter's Wort, cultivated by seed or cuttings.—*Riddell.*

(7997) SYMPHYTUM OFFICINALE. Συμφυτον, Diosc. iv. p. 9.

Sunkootun, HIND

Roots large, externally black, and branching, about a foot long, the thickness of the finger, fleshy, brittle, succulent, and pulpy. Inodorous, taste, sweetish and mucilaginous. The plant is highly mucilaginous, and rather astringent, it also contains sugar and albumen. The recent root is in popular use in France in cases of rupture and bruises. Indeed the plant derives its name from its supposed virtue in consolidating wounds.—*O'Shaughnessy, page* 496.

(7998) SYMPLOCOS (from συμπλοκή a knitting together), a genus of Plants belonging to the natural order *Styraceæ.* This genus was made the type of a natural order, *Symplocineæ*, by D. Don, which contained only this example. It has a 3-parted half-inferior calyx ; rotate monopetalous 3-10-parted corolla, imbricate in æstivation ; indefinite stamens inserted in the lobe of the corolla, with the filaments cuspidate at the apex, and polyadelphous at the base ; erect anthers bursting longitudinally ; 3-5-celled ovary with 4 ovules in each cell. The fruit is a fleshy drupe, containing a 3-5-celled nut ; the cells containing but one seed, which has an inverted embryo lying in albumen, and a superior radicle. The species are trees, having alternate either entire or serrated leaves without stipules, and turning yellow in drying. The flowers are axillary, sessile, or pedunculate, few, of a white or scarlet colour, and supplied with bracteas at their base. Upwards of 30 species have been described. They all possess an astringent principle in their leaves, and some are used in dyeing.—*Eng. Cyc.* Wight, in Icones, gives Symplocos foliosa, 1234 ; Gardneriana, 1231 ; microphylla, 1232 ; monantha, 1236 ; nervosa, 1235 ; obtusa, 1233 ; pendula, 1237 ; pulchra, 1230 ; *racemosa*, 1235.

(7999) SYMPLOCOS RACEMOSA, RACEMED SYMPLOCOS.

Lodh. HIND.

Racemose-Flowered Symplocos. Leaves oblong glabrous, serrated ; flowers arranged in racemes, mostly axillary ; nut of fruit 3-celled. This plant is a native of Burdwar and Midnapore, in Bengal. It is used extensively by the natives as a red dye.—*Eng. Cyc.* Grows in the Kotah jungles ; the bark, used to dye red with, is exported.—*Genl. Med. Top. page* 197. The bark of the root is used, and the tree is found in Rajpootanah, but the root is imported into Ajmere from Delhie, and used in dyeing red ; also in medicine, being considered heating, and promotive of the secretions ; used in mesalihs of animals : four seers are sold for one rupee.—*Genl. Med. Top. p.* 144.

(8000) SYMPLOCOS. *Species.* A few of the people of Lampteng in Sikkim find employment in drying the leaves of a shrub, one of the genus Symplocos, for the Tibet market, which are used as a yellow dye.—*Hooker, Him. Jour. Vol.* II. *p.* 41.

(8001) SYMPLOCOS SPICATA. The nuts of *S. spicata* are very hard and resemble a little fluted pitcher. This plant is a native of Silhet.—*Eng. Cyc.*

(8002) SYNANTHEREA. A great and very natural order, usually termed *Compositæ*, and named as above from their anthers being collected into one adherent mass. They have been also named *Syngeneseæ* from the same cause. It is composed of herbaceous, rarely woody plants, with compound flowers, that is, bearing a variable number of flowers, sometimes uni-sexual, and sometimes hermaphrodite, united together on a common receptacle. They occur in all parts of the globe ; in France they constitute as much as one-seventh of all the phanerogamic division ; at the Cape one-sixth ; in Germany one-eighth ; in America one-sixth. Dr. Wallich enumerates 426 India species from the plains and mountains of India. A bitter principle abounds in several of this order, for example in the Absinthiums or wormwood ; essential oil exists plentifully in the camomiles and pellitory, and these species are at the same time exceedingly bitter ; the seeds of many possess a fixed oil in such quantities as to render its manufacture economical ; for instance, the seeds of the sunflower, and ramtill. The essential oil resides in the perisperm, the fixed oil in the almond.

The proper juice of some Synantheræ is milky and rather narcotic, still but few are justly suspected of dangerous properties. Starch is but in very small proportion in any of the species, hence few can be deemed alimentary, though from the presence of mucilage, saccharine matters, and extractive or modified bitter principles, some are used as table vegetables, such as the artichoke, lettuce, and endive ; no peculiar principle of much importance has been detected in the plants of this order.

In their medical uses these plants are tonic, febrifuge, vermifuge, or emollient. The properties of one species generally co-exist in all the congenerous individuals, and thus the research for substitutes is much facilitated.—*O'Shaughnessy, page* 405.

(8003) SYNDESMIS TAVOYANA. MERGUI RED-WOOD.? Mergui red-wood is a valuable dye wood for both black and red, but more especially for orange. From an article in the Journal of the Asiatic Society, it appears that " a number of experiments, made at the request of Mr. G. Swinton, by Mr. Thomas Speir, upon the Mergui dye wood, prove that it affords, with the mordants commonly used by dyers, colours equally bright, and of a more permanent nature than those of most other dye woods. The colours imparted to silk with different mordants were as follows :—

1.—*Muriate of tin.* Three shades of orange, varying with the temperature of the bath, and the time of immersion.

2.—*Acetate of alumin.* Two shades of flame colour.

3.—*Acetate of iron.* Two shades of drab.

4.—*Ditto, with a weak decoction of galls.* A fine black, two shades.

5.—Mixed with *manjit*, a variety of red and pinks are obtained, but not perhaps equal in ntensity to those of the *manjit* alone. The chief attraction of this wood as a dye, is the orange colour which it yields with the aid of muriate of in and acetate of alumina, of a great variety of shade.—*Mason.*

These results shew that the Mergui wood is deserving of further attention, and that it may become eventually an important article of commerce with our possessions on the Tenasserim Coast." It is not quite certain, however what tree produces, the Mergui red-wood. The flowers which accompanied the specimens of the wood sent to Calcutta, belonged o the Burman black varnish tree, yet Mr. Maingay who sent them, thought it a different tree. Mr Mason imagines there was some mistake, and that the Mergui red-wood is dentical with the Tavoy red-wood, viz. *Syndesmis Tavoyana.*—*Mason.*

Tavoy red-wood makes handsome furniture, and is used in Tavoy for the same purposes to which gum kino wood is applied at Maulmain. When the wood is steeped in ferruginous mud, it turns jet black, and looks like ebony. The large cylinder knobs, one or two inches in diameter, so often noticed in the ears of Karen women at Tavoy, are made of this wood after the colour has been changed.—*Mason.*

(8004) SYNGNATHIDÆ, a family of Fishes, embracing, according to some authors, the Pipe-Fishes, the Sea-Horses, and the Winged Sea-Horses. These forms are sometimes assigned to distinct families, as in the following definitions :—

(8005) *Syngnathidæ*, Pipe-Fishes.—Body prolonged, slender, linear, or angulated ; snout greatly prolonged, cylindrical ; mouth terminal, vertical. Ventral fins absent ; caudal fin wanting in some.

(8006) *Hippocampidæ*, Sea-Horses.—Head and body compressed ; snout narrow, tubular ; mouth terminal. Pectorals small ; dorsal single ; caudal fin wanting.

(8007) *Pegasidæ*, Winged Sea-Horses.—Body broad, depressed ; snout suddenly contracted, narrow, somewhat protractile ; mouth terminal, beneath. Pectorals generally large ; caudal fin small. They all agree in having the endo-skeleton partially ossified ; exo-skeleton ganoid ; gills tufted (hence the group is named *Lophobranchia*), in the opercular aperture being small, and the swimming-bladder without an air-duct. We shall illustrate this family by a short description of the British species :—

(8008) *Syngnathus* has the body elongated, slender covered with a series of indurated plates arranged in parallel lines. Head long ; both jaws produced, united, tubular. No ventral fins. In certain of the species the males are furnished with an elongated pouch under the tail ; these are called marsupial, and include the British species *S. Acus* and *S. Typhle.*

(8009) *Syngnathus Acus*, the Great Pipe-Fish, is one of the most common forms of the genus. It is found on many parts of the British coast, sometimes at low-water amongst sea-weeds , at other times in deep water. The most curious feature in the economy of this fish is the fact that the roe is transferred from the belly of the female to the pouch of the male.

(8010) *Syngnathus Typhle* (Linnæus), the Deep-Nosed Pipe-Fish, Lesser Pipe-Fish, or Shorter Pipe-Fish ; *Acus Aristotelis* and *Typhle antiquorum* of Willughby. This fish is distinguished from the last by the more compressed form of the jaws. From the British species it is distinguished by the possession on the part of the male of a pouch for the reception of the ova. The habits of this fish resemble those of the last.

(8011) *Syngnathus æquoreus*, the Æquoreal

Pipe-Fish. This fish has no subcaudal pouch. It is comparatively rare on the British coast.

(8012) *Syngnathus anguineus*, the Snake Pipe-Fish. Although this and the preceding species possess no subcaudal pouch, the ova after exclusion from the female are carried by the male in separate hemispheric depressions on the external surface of the abdomen.

(8013) *Syngnathus ophidion*, the Straight-Nosed Pipe-Fish, is known by its stright nose. It is about nine inches in length.

(8014) *Syngnathus lumbriciformis*, the Worm Pipe-Fish, is the smallest of the British species. It has been taken on various parts of the coast. It does not exceed five inches in length. The young of this species have been observed to undergo a curious metamorphosis. On their escape from the egg the tail is covered with a fin-like membrane, and it also possesses pectoral fins. During their growth the caudal membrane and pectoral fins are absorbed.

(8015) *Hippocampus.*—The Jaws are united and tubular, the mouth placed at the end. The body compressed, short, and deep. The whole length of the body and tail divided by longitudinal and transverse ridges, with tubercular points at the angles of intersection ; both sexes have pectoral and dorsal fins ; the females only have an anal fin ; neither has ventral or caudal fins.

(8016) *Hippocampus brevirostris*, the Sea-Horse, or Short-Nosed Hippocampus, is occasionally met on the British coasts. The habits of these creatures are very singular. When swimming about they maintain a vertical position, but the tail is ready to grasp whatever meets it in the water. It quickly entwines in any direction round weeds or other objects, and when fixed the animal intently watches surrounding objects and darts at its prey with great dexterity. When two are together they often twist their tails together. Their eyes move independently of each other, as in the chameleon.

(8017) *Pegasus* has a snout as in the previous genera, but the mouth is under it, and moveable. Two distinct ventral fins behind the pectoral, which are often large, hence the name of *Pegasus* or Flying Horse. The species are found in Indian Seas (Yarrell, *History oj British Fishes* ; Adams, *Manual of Natural History.*)—*Eng. Cyc.*

(8018) SYRINGA (from σύριγξ, a pipe), the name of a genus of Plants belonging to the natural order *Oleaceæ.* The English name of this genus, Lilac, is said to be derived from 'lilag,' the Persian for a flower It is known by a small 4-toothed calyx ; funnel-shaped corolla, with a 4-parted limb ; 2 stamens ; a trifid stigma ; a 2-celled, 2-valved, 2-seeded capsule ; the valves boat-shaped, with a dissepiment in the middle. The species are natives of Europe and the colder parts of Asia. They are deciduous shrubs, with simple leaves, having purple or white flowers, which are arranged in beautiful thyrsoid terminal panicles, and are very fragrant.—*Eng. Cyc.*

(8019) SYRINGA is also the name that is commonly but improperly given to the species of *Philadelphus*, or Mock-Orange. The name *Syringa* was given to the Lilac on account of its stems being used for the manufacture of Turkish pipes. The stems of the *P. coronarius* are also used for the same purpose, and equally with the Lilac it had the name of Pipe-Privet, or Pipe Tree, given it when first introduced into great Britain and afterwards the name *Syringa.* —*Eng. Cyc.*

(8020) SYRINGA CHINENSIS, Chinese Lilac. Leaves ovate-lanceolate. Flowers purple. It is a native of China. In character it is intermediate between *S. vulgaris* and *S. Persica*, and agrees with a hybrid plant produced at Rouen by M. Vain, and called *S. Rotomagensis*, the Rouen Lilac. It is a plant that grows vigorously, and attains a height of ten or twelve feet. The sorts known in nurseries as the Belgic Lilas de Marly and the Lilas Sangé, are varieties of this species.—*Eng. Cyc.*

(8021) SYRINGA EMODI has elliptical-oblong leaves, glaucous beneath, attenuated at the base, and acuminated at the apex, with purple flowers. It is a native of Kumaon near the Himalayas.—*Eng. Cyc.*

(8022) SYRINGA PERSICA, the Persian Lilac. Leaves small, lanceolate. Flowers purple. It is a native of Persia, and is a small shrub, from four to six feet high. It is one of the most ornamental of low deciduous shrubs, and on that account is very commonly cultivated. When planted in pots and forced, it may be made to flower at Christmas ; but by this process the fragrance of the flowers is lost. Of this species also three varieties are found in English nurseries, the White, the Cut-Leaved, and the Sage-Leaved Persian Lilacs.—*Eng. Cyc.*

(8023) SYRINGA VILLOSA has villous leaves, and is found in China on mountains about Pekin, but neither of these species is cultivated in England although both would probably bear the climate.—*Eng. Cyc.*

(8024) SYRINGA VULGARIS, the Common Lilac, known by its ovate heart-shaped pointed leaves. It is a native of Persia, Hungary, and the borders of the Danube. Dr. Sibthorp found it wild on Mount Hæmus, but not in Greece. This shrub has been long cultivated by the Turks, and was brought from Constantinople to Vienna by the ambassador Busbequius, in the middle of the 16th century, from whence it spread over the rest of Europe. It is now one of the commonest ornaments of our shrubberies blossoming, together with the laburnum, in May. It is one of the few shrubs that resists the injurious influence of the smoke of cities, and flourishes in great perfection in most of the squares of London. It grows to the height of 20 feet and upwards, and sends up from the parent stem an abundance of suckers, which, if allowed to grow, form a dense mass of stems : these are commonly left, but if cut down as they are produced, the parent stem may be trained so as to grow as a small tree. It grows very fast, as much as from eighteen inches to three feet in the year, and endures, according to the soil, for twenty to fifty years. Several varieties are well known.—*Eng. Cyc.*

(8025) SYZYGIUM, a large tropical genus of Plants belonging to the natural order *Myrtaceæ*, so named from συζυγος, coupled, in consequence of the manner in which the branches and leaves are united together in pairs. The calyx-tube is obovate, with the limb nearly entire. Petals 4-5, forming a calyptra ; stamens numerous, free ; style single ; stigma simple ; ovary 2-celled, ovules several in each cell. Berry 1-celled, 1- or few-seeded. Trees, or shrubs, of a highly ornamental appearance from their smooth shining leaves, which are opposite and entire.

Of the species, *S. Guineense*, a native of the coast of Guinea and Senegal, has been employed as a remedy in rheumatism. *S. paniculatum*, a native of the Isle of Bourbon, is there called Bois a Ecorce Blanche. *S. Jambolanum* is a native of the East Indies, and there most extensively diffused, being planted near villages in clumps of trees, chiefly on account of its fruit, which is sometimes called Java Plum by Europeans, but Jamoon by the natives. It is of a rich purplish colour, but of a subastringent sweetish taste, which is more agreeable to the native than to the European palate. The fruit is sometimes soaked for an hour in salt and water, when it makes an approach to the flavour of olives. The bark is astringent, and dyes of a brown colour ; the wood is hard, close-grained, and durable, and therefore much employed.—*Eng. Cyc.* Dr. Wight, in Icones, gives Syzygium *carophyllaceum*, 540 ; densiflorum, 999 ; Jambolanum, 535- 553 ; lanceolatum, 530 ; nervosum, 552 ; oblatum, 622 ; rubicundum, 538 ; rugosum, 339 ; salicifolium, 539 ; and Zeylanicum, 73.

(8026) SYZYGIUM JAMBOLANUM.

Jamoon, Hind.
Nawel Marum, Tam.
Nœrala Mara, Can,
Neradi, Tel.

A fine large tree of common occurrence, suited for avenues ; the fruit small, and somewhat astringent, sold in the bazars. The wood is much used for ordinary purposes, but is of little value. Travancore 361, Mysore 21,22,37, Masulipatam, Palamcottah 247, Bangalore 307, Hort. garden 45. The bark," Neradi Bark," has been classed as a tanning substance by Buchanan, in his journey to Mysore, and in the Jury Reports of the Great Exhibition, but it proved a failure even with the careful management of Mr. Bowden.—*M. E. J. R.*

T.

(8027) TABASHEER, Banslochun, Sugar of Bamboo,

Tabasheer, Arab.
Bansk, Beng.
Chuh-hwang, Chin.
Oonamakoo. Uualic, Cyng.
Banslochun, Cash.
Tabachir, Fr.
Tabaschir, Ger-
Vanslochun, Guz.
Tabasheer, Hind.
Tabashir, Lat.
Tabashir, Turk.
Moongil ooppoo, Tam.
Veduroo-ooppoo, Tel.
Banslochun. Beng.
Tivakshera. Sans.

A siliceous concretion found in joints of the female bamboo. It is bluish white, concrete, adhesive to the tongue, at a red heat fuses into a transparent glass It is composed of silica 70, potash 30, per 100. The Persians deem it tonic and aphrodisiac. The Arabs suppose it to be astringent. From its composition we are warranted in supposing it to be entirely inert.—*Faulkner. O'Shaughnessy, page* 694.

Some Tenasserim bamboos secrete tabasheer, which has a place among native medicinal substances.—*Mason.* It resists acid, is indestructible by fire ; and forms, on being fused with alkalies, a sort of glass. It is much esteemed by the Hindoos, Persians, and Arabs as a powerful tonic, and is said by them to have great efficacy in internal bruises. It is imported into Bombay chiefly from Singapore : small quantites are also brought from the Malabar Coast.—*Faulkner.* Dr. Irvine has often removed it from old bamboos at Hoshungabad. It is brought to Ajmeer from Hurdwar, and is used as an aphrodisiac and in general debility. One massa is the dose, and it is sold at two tolahs for one rupee.—*Gen. Med Top. p.* 128.

(8028) TABERNÆMONTANA, a genus of Plants belonging to the natural order *Apocynaceæ*, found in the West Indies and South America, also in Australia, India, and other tropical parts of Asia. The genus is characterised by having monopetalous inferior flowers ; corolla salver-shaped ; stamens 5, included ; anthers sagittate : ovaries 2 ; style filiform ; stigma dilated at base, trifid. Seeds in a follicle, immersed in pulp. The flowers of many species are very sweet scented, and the double-flowered variety of *T. coronaria* is a very ornamental shrub, and one of the most common in Indian gardens. The deep red pulp surrounded the seeds of this species appears capable of yielding a beautiful colour. The cream-like sap of *T. utilis*, the Milk-Tree, or Hya of Demerara, is not only of an innoxious character, but said to be very nourishing. It affords a remarkable example of a tree of this suspected family yielding an article of food. Some of the other species are employed as medicines in the countries where they are indigenous. The sap of *T. persicariæfolia* is considered a poison in Mauritius. The wood is employed in turnery. Dr. Wight in Icones, gives Tabernaemontana coronaria, 477 ; crispa, 470 ; dichotoma, 433 ; parviflora, 393 ; and recurva, 476.

(8029) TABERNÆMONTANA CORONARIA. GARLAND. TABERNAÆMONTA.

Firki Tugar, HIND.,

Is the name of the single flowered Tabernæmontana, and Bura-Tugur that of the double flowered. Common in gardens at Kotah and elsewhere. This shrub is very ornamental and the flowers are fragrant during the night.—*Genl. Med. Top. p.* 186 In the Dekhan Tabernæmontana Corouaria, is a common shrub in gardens with dark shining leaves, flowers generally double, colour pure white, resembling wax, having a faint pleasant smell ; propagated readily by cuttings.—*Riddell.*

(8030) TEBERNÆMONTANA CORONARIA, VAR : FLORA PLENA.

The foliage of the double flowered Garland Tabernæmontana tree very beautifully contrasts with its large blue white double flowers ; which are often improperly called on the Tenasserim Coast, " wax flowers " The wax flower of Bengal is a trailing creeper, *Hoya carnosa*, which has been recently introduced into European gardens. The single flowered variety is seen occasionally but not often.—*Mason.*

(8031) TABERNÆMONTANA PERSICARIÆFOLIA, POLYGONUM LEAVED TABERNÆMONTANA.

Tugur, HIND.

A straight middling sized tree in the gardens at Kotah ; the tree is sacred, and the wood is scented and used in incense.—*Genl. Med. Top. p.* 186.

(8032) TABERNÆMONTANA RECURVA. RECURVED TABERNÆMONTANA. This is a low shrub indigenous about Maulmain, remarkable for its recurved peduncles and fragrant flowers.—*Mason.*

(8033) TABLE-CLOTHS. This manufacture is carried on at the towns of Cuddalore, Chingleput, and in the outskirts of Madras, and are equal in quality to those of English manufacture. They are of different sizes, the largest 9 cubits in breadth and 15 in length and 12 cubits long by 6 broad, the smallest 9 by 4. They are sold at different rates. The Table cloths and Napkins of Pondicherry from the works of Monsieur R. Godfroy are very good in quality, var ing in size from the ordinary table cloth to tho of dimensions suited to public entertainment The Madras Exhibition Jury expressed their u qualified approbation of this fabric, made wi thread and wove, with machinery set up by th enterprising firm connected with this manufactu in this country. The design, now commonl called the Damask pattern, and imitated in vari ous parts of the Madras Presidency, was intro duced at these works. The Jury desired to brin this manufacture to the especial notice of th Committee of the Madras Exhibition and award ed a 1st Class Medal.—*M. E. J. R.* Polar Chett exhibited the finest quality of wove Table Cloth and Napkins made at Madras, the Jury awarde him a 2nd Class Medal.—*M. E. J. R.*

(8034) TACAMAHAC. A resin obtained fro the *Fagara Octandra* ; and likewise, it is sup posed, from the *Populus balsamifera* It is im ported from America in large oblong masse wrapt in flag leaves. It is of a light brown colour very brittle, and easily melted. When pure i has an aromatic smell, between that of lavende and musk ; and dissolves completely in alcohol water having no action on it. *Thomson's Chemistry.—Faulkner.*

(8035) TACCA, a genus of Plants belonging t the natural order *Taccaceæ*, placed near *Aroidaceæ*, and *Aristolochiaceæ*, and resembling *Dioscoreaceæ*, in having radical tubers whic abound in fæcula. The genus is named from the Malay name of one of the species, which are foun in the hotter parts of India and in the South Se Islands. The genus is characterised by having 6-partite calyx, with a 6 partite corolla, and stamens which are inserted in the calyx : styles 3 ; stigmas stellate. Very dry, hexangular, many-seeded. The plants have perennial tubers, with a short compressed rhizoma, from which proceed the stalked and the so-called radical leaves and herbaceous scapes. The plants of this family are possessed of some acridity both in their tubers and in their herbaceous parts, but the roots lose some of this quality by culture, at the same time that they become larger. Those of *T. pinnatifida*, the best-known species, and a native of the Malayan Peninsula, the Moluccas, Madagascar, and Australia, are roundish, red, the size of a man's fist, extremely bitter, and acrid. The tubers of this plant, and also those of *T. dubia* and *T. montana*, are rasped and macerated for four or five days in water; a white highly nutritious fæcula like arrow-root is then separated, and, like sago, is employed as an article of diet by the inhabitants of the Malayan Peninsula and the Moluccas. In Tahiti and some of the Society Islands they make cakes of the tubers of *T. pinnatifida*, which are the Tacca Youy of some navigators. They form an article of diet in China and Cochin-China, and also in Travancore, in India, where, according to

Dr. Ainslie, they attain a large size, and the natives eat them with some acid to subdue their acrimony. (Royle's 'Illustr.,' p. 378.) The petioles and stalks boiled for some time are also used as articles of diet in China and Cochin-China. In Tahiti the plant is called Tya: its fæcula is largely prepared, and is sometimes preferred to that of Maranta arrow-root by the English, to whom it is sold under that name by the native converts at the missionary station, and exported to London. It is also sometimes called Tahiti Salep. This plant must not be confounded with the *Arum macrorhizum*, the tuberous root-stalk of which is also edible, and when prepared is called Taka, which similarity in name and in uses has frequently caused confusion, and the mistaking of one plant for the other. In Singapore *T. cristata* is called Water-Lily.—*Eng. Cyc.*

(8036) TACCA PINNATIFIDA Lin.

Cara Carnay kalung, Tam.
Kunda, Duk.
Cunda gudda Tel.
Toja, Bunda.
Tacca, also Leeker, Malay.
Soorana, Sans.

This root, says Ainslie, appears to be eaten in many Eastern countries, such as China, Cochin-China, and Banda, in which last mentioned, where sago is scarce, it is in common use. In Otaheite and other Society isles, they make, of the meal of it, a nourishing gelatinous cake, like that made of salep. It possesses a considerable degree of acrimony, and requires frequent washing in cold water previously to its being dressed. In Travancore, where this root grows to a very large size, and is called Chanay kelengu, it is much eaten by the Natives who are in the habit of mixing a sufficient portion of some agreeable acid with it, to subdue its natural pungency.—*Ainslie p.* 248. See Arrow Root, also Food, also Maranta.

(8037) TACCACEÆ, a small natural order of Endogenous Plants belonging to the Epigynose group. There are but two genera belonging to this order, *Tacca* and *Attaccia*. The species are large perennial herbaceous plants, with a tuberous root, a short stem bearing scapes, and having exstipulate radical pedatifid pinnatifid rarely entire leaves, with curved parallel veins. The flowers, which are placed on the top of a single scape, are in umbels, and are united; the tube of the perianth is superior, and united to the germen; limb petaloid, equal or unequal, persistent; stamen 6; filaments dilated; ovary composed of 3 connected carpels, with 5 parietal polyspermous placentæ; styles 3, connate. The fruit baccate, with seeds lunate, striated, and the embryo situated on the outside of fleshy albumen.—*Eng. Cyc. p.* 1004.

(8038) TACSONIA PINNATISTIPULA. Passifloraceæ. These are climbing plants nearly allied to the Passion Flowers, and require the same treatment. Colors rose or pink.—*Riddell.*

(8039) TADAH WOOD.

Tadda, Tel. | Kakatatee, Tam.

(8040) TÆNIS BLECHNOIDES, Tapeworm fern. The tapeworm fern, so called from the resemblance of the line of sori to a tape worm, is not infrequent in Tenasserim.—*Mason.*

(8041) TAGETES ERECTA, Tall Marygold.

Geuda, Hind.

A great variety in gardens.—*Gen. Med. Top. p.* 206.

(8042) TAGETES LUCIDA, Compositæ. African Marigold. This is common in all gardens, and readily grown from seed.—*Riddell.*

(8043) TAGETES PATULA, French Marygold.

Gool-jafare, Hind.

Common in gardens.—*Gen. Med. Top. page* 206.

(8044) TALAUMA HODGSONI, a magnolia growing on Tonglo in Sikkim at an elevation of several thousand feet. It is a large tree, with very dense foliage, and deep shining leaves, a foot to eighteen inches long, most of its flowers drop unexpanded from the tree and diffuse a very aromatic fragrance: they are nearly as large as the fist, the outer leaves purple, the inner pure white.—*Hooker, Him. Journ. Vol.* I. *page* 163.

(8045) TALC.

Kobub ul arz, Arab.
Minirum, Cyng.
Tulk Cash.
Tulk, Duk.
Talc, Fr.
Talk, Ger.
Appracum, Tam. Tel.
Abruck, Tulk, Guz. Hind.
Talcum, Lat.
Tulk, Pers.
Abraka, Sans.
Tilk, Turk.

Talc is one of the hydrous silicates of magnesia. It occurs *crystallized* and *massive*. The primary form of the crystal is a rhomboid, but it usually occurs in the secondary form of hexagonal laminæ, and even in long prisms. The cleavage is distinct and perpendicular to the axis. It is readily separable into thin plates, which are flexible, but not elastic. The lustre is pearly, and the colour a shade of light green or greenish white: sometimes it is silvery-white and also greyish-green and dark olive green. It is unctuous to the touch, and is easily impressed by the nail,—the hardness being equal to 1 or 1.5: the density varies from 2·7 to 2·9. Crystallized talc occurs in small quantity in serpentine rocks, accompained by carbonate of lime, actinolite, steatite, and massive talc, &c. The massive varieties occur in beds of micaceous schist, gneiss, and serpentine. Massive talc or soap-stone reduced to powder forms what is called *boot-powder* or Bootmaker's dust, dusting the inside of a tightly fitting boot with this substance to enable it to be drawn on easily.

This substance was largely used some years ago at Manchester, as one of the ingredients for converting an inferior low-priced tea into a high-priced one. The manufacturers of boot-powder, surprised at the large demand for their article by one house, and that house a tea-ware-house, made some inquiries, which led to sufficient publicity to put a stop to the fraud.—*Faulkner. Tomlinson.* *Talc or Mica*, has been used as a substitute for glass, in the taking of Collodion Pictures, the Collodion film adheres to it very firmly. On it Negatives can be as easily carried, without injury, in a portfolio, as on paper, and positives backed with color, and a plain varnish can be pasted, without risk of deterioration in a book. The mica being attached to a piece of glass by its back being moistened, may be then coated, exposed and developed, after which it may be detached and fixed. Talc mines abound in Bengal : upwards of a thousand maunds or nearly forty tons are sent to Calcutta annually, of the value of seven thousand five hundred rupees, at seven and half rupees per maund. —*Friend of India.*

Indurated talc occurs in primitive mountains, in clay-slate, and serpentine ; it is massive, of a greenish-grey colour ; the structure schistose and curved ; it is of a shining and sometimes pearly lustre ; translucent, soft and rather unctuous to the touch, and of the sp. gr 2.9. Lamellar talc contains, according to Vauquelin, silica 62 per cent. magnesia 27, alumina 1.8, oxide of iron 3.2 and water 6. Nearly allied to mica, are steatite, chlorite, and other magnesian minerals. —*Eng. Cyc.*

Talcose slate resembles mica slate [See Mica], but has a more greasy feel from its containing talc instead of mica. It is of a light-grey or dark-greyish brown colour ; it breaks into slabs, which are used for fire-stones. *Talcose rock* is a kind of quartzose granite, containing more or less talc : it is intersected by veins of white quartz, and also contains chlorite. "The talcose rocks," says Dana, "are, to a great extent, the gold-rocks of the world. This rock contains the topaz of Brazil, and also euclase, and many other minerals."—*Tomlinson.*

(8046) TALIPOT TREE. Corypha umbraculifera, is one of five species of a genus of palms, all inhabitants of Asia. The Talipot tree grows in stony parts of the mountains of Ceylon, Malabar and the Malay coast. Its leaves are of gigantic size, the petiole being seven feet long, the blade six feet long and thirteen broad. The out spread leaf affords shelter for seven or eight persons. They are extensively used by the Cingalese as umbrellas and some of their records are written with a style on pieces of the blade of this palm.—*Seeman.*

(8047) TALLOW.

Shahum, Arab.
Hurruk tail, Cyng.
Suif, Fr.
Talg, Ger.
Churbee, Guz. Hind.
Sevo, It.
Lemakchair, Mal.
Pech, Pers.
Salo, Toplenoe, Rus.
Sebo, Sp. Port.
Maat Kolupoo, Tam.
Passarum kowoo, Te
Govapa, Sans.

Animal fat melted and separated from th fibrous matter mixed with it. It is procure chiefly from oxen and sheep. Its quality depends principally on the care taken in purifyin it, and also to a certain extent from the anima from which it is obtained. Tallow is an important article of trade, being used in the manufacture of candles, soap, in the dressing of leather and in various other processes of the arts.—*Faulkner.*

(8048) TAL MAKHANA. The seed of thi plant comes from Shekhawattee to Ajmere : i stimulant, used in general debility, but chiefly a an aphrodisiac.—*Genl. Med. Top. p.* 152.

(8049) TALPIDÆ, a family of Animals belonging to the order *Insectivora*, and includin the Moles. The genus *Talpa* of Linnæus, as i stands in the 12th edition of the 'Systema Naturæ between the genera *Didelphis* and *Sorex*, comprises two species only, *Tulpa Europæa*, the Common Mole, and *T. Asiatica.*—*Eng. Cyc.*

(8050) TAMARICACEÆ, *Tamarisks*, a smal natural order of Plants, belonging to the syncarpous group of Polypetalous Exogens. Th species are either shrubs or herbs, having rod-like branches with alternate entire leaves, resembling scales ; the flowers are in dense spikes o recemes. The calyx is 4-5 parted, persistent the petals inserted into the calyx, both with imbricate æstivation ; stamens hypogynous, distinct or united, equal in number with the petals or twice as many ; ovary superior, with a short style and 3 stigmas ; fruit a capsule, 3-valved. 1-celled, with numerous seeds, which are comose embryo straight with an inferior radicle. Th species are found only in the Old World ; the greatest number being met with in the basin o the Mediterranean. The plants of this order are innocuous and all are more or less astringent. and their ashes after burning are remarkable for possesing a large quantity of sulphate of soda. *Myricaria germanica* is recommended as a diuretic.—*Eng. Cyc.*

Dr. O'Shaughnessy tells us that this well known order occurs in many parts of the world chiefly in hot and sandy districts adjacent to the sea or great rivers. Dr. Roxburgh describes two in India, the *Tamarix indica* (probably identical with *T. gallica*) and *dioica* (*jhuo*). The *T. Furas* occurs in the drier parts of the Doab, and in the neighbourhood of Delhi, where it is called *Asul* or *Atul* as in Arabia ; other species are also found in the peninsula.

The Tamarices are bitter and astringent. In Denmark they are used instead of hops for making beer, and in some parts of Europe as a tonic remedy. Galls are formed on the *T. Furas*, and are called *Sumrut-al-asul* . or *Chotee mue.* On the Jhon they are named *Sumrut-ul-toorfa*, or *Burree mue.* They are imported from Moultan.

The T. gallicas of Mount Sinai is at certain seasons covered with a kind of sugary exudation, said by Ehrenberg to be produced by the puncture of the Coccus maniparus. It is called Arabian manna, or Guzunjabeen ; it is unknown in the Bazars of Bengal, and is not produced in India. (*Royle*, p. 213, 214.)—*O'Shaughnessy*, *page* 332,

(8051) TAMARIND *Tamarindus.* L. E. D. Leguminis Pulpa, L., D. Pulp of the Pods, E. Tamarindus Indica, *Linn.* Fruit of the Common Tamarind Tree. *Monadelphia Triandria*, Linn.

Umlie, ARAB.
Cay-me, COCH CHIN.
Mahasiambala, CYNG.
Imlee, Umbulee, CASH.
Tamarins FR.
Tamarinden, GER.
Amblee, GUZ. HIND.
Tamarindo, IT.
Kamal, JAV.

Tamarindus LAT.
Neghka MAL.
Tumr-i-hindee, PERS.
Amlika Tintili, SANS.
Tamarindo, SP.
Demer-hindee, TURK.
Poolie, TAM.
Chinta-pundoo, TEL.

Tamarind is the fruit of the *Tamarindus Indicus*, growing in the East and West Indies, the Eastern Islands, Arabia, and Egypt, to the height of 30 or 40 feet. When the fruit is ripe the shell or epicarp is removed, and the fruit placed in layers in a cask, boiling water being then poured over it. Another plan is to put alternate layers of tamarinds and powdered sugar in a stone jar. Tamarinds are imported both raw and preserved. Tamarind pods are from 3 to 6 inches long, and more or less curved: they consist of a dry, brittle, brown external shell, within which is the acidulous, sweet, reddish-brown pulp (which is the useful part) penetrated by strong fibres. Within this is a thin membranous coat enclosing the oval brown seeds. The pulp as analysed by Vauquelin conains citric acid 9·40, tartaric acid 1·55, malic acid 0·45, bitartrate of potash 3·25, sugar 12·5, gum 4·7, pectin 6·25, parenchyma 34·35, and water 27·55. The pulp allays thirst, is nutritive and refrigerant, and in full dose laxative. " An inusion of tamarind," says Pereira, " forms a very pleasant, cooling drink, as does also tamarind whey." Infusion of senna with tamarinds is a useful laxative.—*Tomlinson.*

Tamarinds form a large export from India, being packed in tin with or without syrup.—*M. E. J. R.* The fruit of the *Tamarindus Indica* is used by the natives of India and Persia in making a herbet or cooling drink; and also as a necesary ingredient in curries, to which it communiates a tartish flavour. Several varieties are distinguished, such as the *red* tamarind, the *sweet* tamarind, obtained from Persia; the *dark* tamarind, produced in Madura, one of the Eastern Islands; and the *common* or *green* tamarind, which is extensively produced throughout India.—*Faulkner.* Ainslie tells us that this refrigerant and pleasant tasted acid fruit, is reckoned by the Natives of so wholesome a nature, that it is a constant ingredient in all their curries. Sherbet prepared with it is more grateful to the taste, and infinitely more wholesome than that made with limes.—*Ainslie, p.* 231. Tamarinds are imported into Britain either simply dried, as from India, where there are three varieties, one with dark, another with red and a third with light coloured fruits. In the West Indies, the outer shell having been removed, they are preserved either between layers of moist sugar or in syrup. Preparations are also made from them with sugar in India, which are employed in making sherbets. They are also used in preserving fish, which is hence called Tamarind Fish. The proper officinal part is the pulp stored up between the seeds and husk. Tamarinds have a powerful acid taste, but when preserved, they are sweet and acidulous, and then form a dark-coloured adhesive mass, containing pulp, stringy fibres, seeds and sugar. Vauquelin, in one of the first analyses he published, found of Citric Acid, 9.4, Tartaric Acid, 1.55.—*Royle.* The *Red Coloured Tamarinds* of India, are found in Guzerat, at Kheir on the Godavery, at Punderpoor on the Seena, and there are four trees in Madras. It is the best of the three Indian varieties.

(8052) TAMARINDUS, a genus of Plants belonging to the Rectembryous division of the natural order *Leguminosæ.* It possesses the following characters:—Calyx cleft, tubular at the base, the three upper lobes reflexed, the two lower ones joined together, but usually indentate at the apex; petals 3, alternate with the three upper lobes of the calyx, the middle one cucullate and lateral ones ovate; the stamens are 9 or 10 in number, two or three of which are longer than the others united at the base, and bearing anthers, whilst the remainder are sterile; the fruit is a legume seated on a pedicel, 1-celled, compressed, with from 3 to 6 seeds, and the valves filled with pulp between the endocarp and epicarp, their inner and outer lining; the seeds are ovato-quadrate in form, possessing cotyledons unequal at the base. There are only two species belonging to this genus, both of which are trees with abruptly pinnate leaves, bearing many pairs of small leaflets and racemes of flowers.—*Eng. Cyc.*

(8053) TAMARINDUS INDICA, LEGUMINOSÆ

PooliaMarum, TAM.
Oonara Mara, CAN.
Amli HIND.

Tamarind-tree, ENG.
Chinta Chettoo, TEL.
Hooli Shena, CAN.

A lofty tree with crooked branches, remarkable for its light and elegant foliage. Leaves abruptly pinnate, with 10 to 15 pairs of leaflets, which are small, narrow, oblong, obtuse. Stipule small, deciduous. Flowers in lateral and terminal racemes, of a yellow colour variegated with red. Calyx turbinate, at the base, limb bilabiate, reflexed, upper lip tripartite, lower broad 2-toothed. Petals 3, unilateral, the middle cucullate. Stamens 2—3, united together, fully developed, 7 very short and without anthers. Ovary stalked, style subulate. Legume pendulous, broad, and thickish, more or less curved, having externally a hard but brittle scabrous rind which does not separate into valves, but under it run some woody fibres, and there lies some acidulous reddish-brown pulp. Seeds from 3 to 12, covered by a membranous coat, flattened, bluntly 4-angled, smooth, hard and brown coloured, inserted into the convex side of the legume. There is no solid foundation for the distinction into two species; *T. orientalis* being supposed to be 6—12 seeded, and *T. occidentalis* 3—4 seeded. —*Royle.* *Tamarindus Indica*, the East Indian Tamarind, was the earliest known species, for a knowledge of which, in Europe, we are indebted to the Arabians. It is distinguished by its elongated legumes, which are six times or more longer than they are broad. It is a native of various districts in the East Indies and also of the tropical parts of Africa. It forms a handsome tree with spreading branches, bearing leaves of a light colour and flowers with a straw-coloured calyx and yellow petals, streaked with red: the filaments of the stamens are purple and the anthers brown. The timber of this tree is very firm, hard, and heavy, and is applied to many useful purposes in building.—*Eng. Cyc.* The Tamarind has been long used in India as an article of diet and in medicine. The Arabs, on becoming acquainted with it, called it *Tamr hindee*, that is, "the Indian Date," whence, no doubt, the Latin name is derived.—*Royle.* Flowering time the hottest part of the year, which is generally in May. Fruit ripens during the cold season or from December till February. The tree is one of the largest in India, with a most extensive, large shady head, the wood hard, very durable and most beautifully veined: it is of slow growth; trees contain beautifully variegated wood, perhaps the most beautiful of any in Southern India—it attains immense size and frequently has a straight trunk for fifty feet, it is used for cotton screws in Madras. Oil mills are generally made of short pieces of the trunk of this tree.—*Rhodes.* The wood of this well known tree is however, little used, perhaps from its liability to become hollow in the centre, so as to prevent good planks being obtained, it is hard, durable and finely veined.—*Wight.* The leaves are eaten in the curries of the natives, the pulp of the fruit is universally known. The seeds formed into a flower are boiled into thick conjee and used as an article of diet by the poor in times of scarcity or famine of the same flour a tenaceous paste is made which serves for various economical uses. The leaves are first boiled in water to form an acid used for cleaning silver articles.—*Rhodes M.S.S.* Throughout Eastern and Southern Asia the tamarind is worthy of care for its ligh beautiful green foliage, and profuse yellowish blossoms with veins of red, as well as for it fruit. It is an exotic on the Tenasserim Coast but is planted by natives around their dwellings for the leaves, which being slightly acid, afford an agreeable condiment to their curries. The tree bears richly in Mergui, but rarely yields fruit abundantly in the northern provinces. The dried fruit is imported into Tenasserim, in large quantity from Burmah, and is constantly for sale in the bazars.—*Mason.* The red tamarind, which is scarce, is the most valuable the seed yields a fine clear oil.—*Riddell.* Every effort should be made to diffuse the red tamarind tree.—*Ed.*

(8054) TAMARIX, the name of a genus of Plants, the type of the natural order *Tamaricaceæ* It has a 4- or 5-parted calyx; 4 or 5 petals; 4 or 5 stamens alternating with the petals, united at the base; a tapering ovary with 3 stigmas; erect tufted seeds, the tuft being composed of a number of hairs proceeding from the apex of the seed. The species have generally paniculated spikes of small flowers of a red colour.

(8055) TAMARIX AFRICANA, the African Tamarisk, is a glabrous glaucous shrub, with lanceolate imbricated leaves; with dense, scaly simple, sessile racemes; with ovate chaffy bracts and a 3-valved capsule. This is a native of the sands along the shores of the Mediterranean It is found in Mauritania, around the Bay of Naples, in Egypt, and in the Levant. It has very much the appearance of *T. Gallica*, but its flowers are larger, and the bark darker. Like *T. Gallica*, its ashes yield a large quantity of sulphate of soda.—*Eng. Cyc.*

(8056) TAMARIX DIOICA, RED TAMARISK.

Lal-jhao, HIND.

Very common in the beds of rivers.—*Gen. Med. Top. p.* 188. It is a very graceful shrub, with numerous small rose-coloured flowers in terminal drooping spikes; common in the beds of rivers.—*Riddell*

(8057) TAMARIX INDICA, INDIAN TAMARISK.

Ferish Ferash, Jhoa, HIND.—*Gen Med. Top. p.* 188.

Tamarix Indica, the Indian Tamarisk, is a glabrous greenish plant with stiff twiggy branches: short ovate-leaves with white edges; elongated spikes of flowers, with bracts shorter than the flowers and longer than the pedicels, and stamens longer than the corolla. This plant is a native of the East Indies. It is subject to the attacks of a cynips, which produces galls that possess astringent properties, and according to Dr. Royle, they are on this account used in medicine by the native doctors of India. The same property also renders them valuable in dyeing. Other Indian species of the Tamarisk produce galls, which are used for the same purposes as those of *T. Indica.—Eng. Cyc.* It is a tree of considerable size, common in the Ajmeer district, but the wood is very inferior.—*Irvine.* In the Dekhan it is a small tree or shrub ; grows abundantly in the beds of many rivers, and affords great shelter for all sorts of game.—*Riddell.* Tamarix Indica grows in the Punjab and in Cashmere. The galls formed on it are officinal, and are exported from Cashmere.—*Thirty-five years in the East by Dr. Honig. p.* 355.

(8058) TAMARIX ORIENTALIS, the Eastern Tamarisk, is a tree attaining a height of from 10 to 20 feet ; it is glabrous all over, with minute, distant, sheathing, mucronate leaves, with slender lateral spikes of flowers, and a 4-valved capsule. This tree is a native of Arabia, Persia, and the East Indies, and is one of the largest and most elegant of the species of the Tamarisk. One of the finest specimens of this tree existing is at Babylon.—*Eng. Cyc.*

(8059) TAMBRA-BIJ. Seed of a small plant from Harowtee ; stimulant.—*Gen. Top. p.* 153.

(8060) TANARIUS MAJOR.

Lacea Tree, Eng. | Laka, Malay.

A tree with a red coloured wood, a native of Sumatra, used in dyeing and pharmacy. It is n article of considerable native trade, and is chiefly exported to China.—*Crawfurd, p.* 204.

(8061) TANNING MATERIALS. The manufacture of leather in India generally, is by no means so thriving as it might be, considering the great abundance of Tanning materi-ls at command. This is probably owing to the very low rank of the Artisans (*Chucklers*), for the rt of leather production is well understood and successfully practised by the European tanners at Pondicherry, Hoonsoor, Guntoor, Bangalore and Madras, the leather being scarcely inferior to that made in Europe.

Goat skins, Sheep skins, Buffalo and Bullocks' Hides are much used and are generally procur-ble, but are very badly dressed, as may be readily magined from the excellent description of the usual process given by Mr. Rohdes, which accompanied the consignment of leather from Guntoor, currying the leather being the province of the wife, while manufacturing it for the market belongs to the husband. Inferiority of Indian eather may be ascribed to want of skill on the part of the currier, and the use of quicklime.

It is generally supposed that there is no better anning material than Oak bark—but it has been hown in the article Leather (See Leather) that imilar substances may be employed with great ucecess, as for instance, Divi Divi, Catechu, Tanghedu Bark, &c., which produce their effect more rapidly, and the leather so manufactured is said to be nearly as durable. At the Madras Exhibition of 1855, a valuable series of Tanning materials accompanied the leather prepared by Mr. Bowden at Guntoor, and some interesting samples were shown from the Government Tannery, Hoonsoor, with hides tanned by the different barks, to illustrate the practical application of these various substances.—*M. E. J. R.* The extract procured from the bark of the Butea ; that of the Buchanania latifolia ; the Syzygium Jambolana &c. are of much consequence to Tanners. —*Spry's Sug. p.* 67. Several species of Acacia, Conocarpus, the gum of the Dhak and others are also used.—*Royle's ProductiveResources of India.* The rose-coloured fruit of the tamarind gives beautiful deep red-colour, approaching purple. The wood of the *Adenanthera pavonina* dyes red, and the wood of the black varnish tree affords a red dye.—*Mason.* The extract procured from the bark of the Butea, that of the Buchanania latifolia, the Syzygium (Calyptranthes), Jambolana, &c. are likely to be of consequence to the tanners, and could be produced in India in large quantities. Specimens of these and of the bark of the Saul tree, of Nyctanthes arbor tristis, Terminalia angustifolia, and of the "*gaub*" fruit (Diospyros glutinosa), were shown by the East India Company at the Exhibition of 1851.—*Simmonds' Comml. Products, p.* 494.

The following are the principal of the substances of Southern and Eastern Asia, which are or may be used in Tanning.

Babool bark,	Aeaeia arabica.
Catechu, cutch,	Aeaeia catechu. Fruit of Aeaeia vera.
Gambier,	Unearia gambier.
Kino,	Pteroearpus marsupium.
Pulas kino,	Butea frondosa.
Turwur,	Cassia auriculata.
Pomegranate rind,	Puniea granatum.
Tamarisk galls, (sumrut-ool-asl,	Tamarix indica.
Divi divi,	Cæsalpinia eoriaria.
Myrobalans,	Terminalia, *several species.*
Gall Nuts,	(Quercus Infeetoria).
Bark of,	Bauhinea variegata,in Sind
Bark of	Careya.
Mangrove Bark,	Rhizophora conjugata.
,, ,,	,, gymnorhiza.
,, ,,	,, mangle.
Bark of,	Bruguiera Rheedii.
,, ,,	,, eriopetala.
,, ,,	,, parviflora.
,, ,,	Carallia lucida.
,, ,,	Kandelia Rheedii.
Juice of,	Asclepias gigantea.
Bark of,	Buchanania latifolia.
,, ,,	Shorea Robusta.
,, ,,	Nyctanthes arbor-tristis.
,, ,,	Diospyros glutinosa.
Petals of,	Hibiscus Rosa-Sinensis.

The Tenasserim Provinces are rich in materials for tanning. It is there that the bark of the Careya, and of half a dozen different species of mangrove, the fruit of the sea-cocoanut, and the peel of a species of ebony, all abound in tannic acid. The principal sources are,

Rhizophora conjugata.
Rhizophora gymnorhiza.
Bruguiera Rheedii.
Bruguiera criopetala.
Bruguiera parviflora.
Carallia lucida.
Kandelia Rheedii.—*Mason.*

The bark of Bauhinia variegata, is made use of as a tanning substance in Sinde and other parts of Asia. The bitter astringent bark and the galls of several of the Tamarisk tribe are also well suited for the purpose. The bark of the Cassia auriculata, and the milky juice of the Asclepias gigantea, are used for tanning in India. —*Simmonds' Comml. Product, p.* 493 *and* 494.

Tannin.—The substance from which pure tannin is most frequently obtained for chemical purposes is nutgalls, for tannin constitutes above 40 per cent. of their weight. It may however, as above shown, be procured from several other sources, such has oak, horse chestnut, sumach, and cinchona barks, catechu, kino, &c. The basis of the skins of animals is composed of a substance to which the name of gelatine is given. One of the properties of this substance is, that when combined with tannin, it forms the compound of tannate of gelatine, or leather, a substance which is so useful to mankind. From time immemorial, the substance employed in Britain, to furnish the tannin to the hides of animals, in order to convert them into leather, had been oak bark. But as the purpose for which oaks are grown there, is their timber, and not their bark, the supply of oak bark cannot be calculated upon, and this is, perhaps, one of the causes why tanning as an art is in such a backward state. The consumption of tannin required in the leather manufacture may be estimated from the fact that more than 672,000 cwts. of raw hides were imported into England in 1851, besides the hides of the cattle, &c., consumed in the United Kingdom. On the Continent of Europe and in the United States, the consumption of bark for this purpose is also considerable. The imports into England, of bark for the use of tanners and dyers has amounted yearly to the very large quantity of 380,674 cwt., besides what England obtains at home. Oak bark contains usually the largest proportion of tannin, and according to Davy's experiments eight-and-a-half pounds of oak bark are equivalent, for tanning purposes, to two-and-a-quarter of galls, three of sumach, seven-and-a-half of Leicester willow, eleven of Spanish chesnut, eighteen of elm, and twenty-one of common willow bark. Tannin obtained from

these sources, however, differs materially in som of its characters. The tannin of gall-nuts, whic is that generally employed for chemical purposes, is sometimes called gallo-tannic acid, t distinguish it from other species. Notwithstanding the number of different substance which have from time to time been introduce for the use of tanners, it is, nevertheless, prett generally acknowledged that there is nothing superior, or even equal, to good oak bark, and tha all attempts to hurry the leather-making proces beyond a certain point by the use of concentrated solutions of tan, &c., are for the most par failures, as the manufacture of good leather, t a great extent, depends on the process bein conducted in a slow and gradual, but—at th same time—thorough .and complete manner Oak bark is, however, as we have alread shown, by no means the only astringent bar well suited to the use of the tanner, and in various parts of the world other similar substance are used with very great success. All thes tanning materials, though they may not be considered by the English tanner equal to the bes oak bark, are, nevertheless, of great value t him ; they may be employed in conjunction wit oak bark, or even as a substitute in times of scarcity, or when the price of oak bark is high ; i fact the very existence of such substances tend to keep down and equalise the price of bark, an to prevent it from undergoing those great fluctuations in value which would necessarily occu were it the only tanning material available t our manufacturers.—("*Prof. Solly in Jury Reports of Great Exhibition.*")

The vast number of barks and other substances useful for tanning purposes, which are found in the tropics, are comparatively unknown or little regarded in Europe ; although they might be readily obtained in large quantities and at a trifling cost. The bark of many species of *Acacia* furnishes the tanning principale in a great degree, particularly that of *A. arabica*, which, under the name of Babul wood, is largely used all over India; where it is regarded as a powerful tonic. The fruit of *A. vera*, termed Egyptian and Senegal "bablah," has been employed in tanning and dyeing. Numerous species of this tribe are found abundant in New South Wales and the Cape Colony, and these, particularly the Wattle bark of Australia, are in common use for tanning, from their astringent properties. The bark and rind of the fruit of the pomegranate (*Punica Granata*) have similar properties. The bark of *Avicenna tomentosa* is in great use in the Brazils for tanning. So are the curved pods of *Cæsalpinia coriaria* in the East and West Indies under the name of Divi-divi. *Coriaria myrtifolia* is not only used in tanning leather, but also for staining black. It is worth £9 to £10 per ton. *Pterocarpus marsupium* furnishes about Tellicherry the concrete exudation called kino, a powerful astringent used for tanning. The plants of the mangrove tribe, *Rhizophora Mangle*, and other allied species, have frequently an astringent bark, which is in many cases used for tanning and dyeing black. This tree is very common in most tropical countries, where it forms dense thickets on the muddy banks of rivers and the sea shores. The bark of *Bauhinia variegata*, is made use of in Scinde and other parts of Asia. The bitter astringent bark and the galls of several of the Tamarisk tribe are also well suited for the purpose.

Mesembryanthemum nodiflorum, one of the numerous indigenous species of the Cape, is used in making morocco leather.

The extract procured from the bark of the *Butea*, that of the *Buchanania latifolia*, the *Syzigium* (*Calyplranthes*), *Jambolana*, &c., are likely to be of consequence to the tanners, and could be produced in India in large quantities. Specimens of these, and of the bark of the Saul tree, of *Nyctanthes arbortristis*, *Terminalia angustifolia*, and of the gaub fruit (*Diospyros glutinosa*), were shown by the East India Company. The bark of the hemlock tree is extensively employed for tanning in New Brunswick.

The bark of yellow hercules (*Xanthoxylum ochroxylon*), and the pods of *Acacia lortuosa* are used for tanning in the West Indies.

In the instructions given by the Admiralty to Sir James Ross, when proceeding on his Antarctic Expedition, his attention was particularly called to the astringent substances adapted for tanning, and to the various extracts of barks, &c. mported into England from our Australian settlements, and which are employed by the tanner. Little sterling information has as yet been obtained as to the qualities of the astringent gums, barks, and dyes, yielded in such abundance by the trees of those colonies, and the proportion of annin they contain. In 1846, 563 tons of bark for tanning were exported from Port Phillip. A large quantity of tannin is extracted from various species of Eucalyptus, the gigantic gum rees in Australia and Van Diemen's Land (of which quarter all the species are natives), and ent to the English market; it is said to be twice as powerful in its operations as oak bark. Some of these trees attain a height of 200 feet. Their bark separates remarkably into layers. A sort of kino gum, an astringent resinous-like subtance, is also extracted from *E. resinifera*, the brown gum-tree of New Holland, which is sold in the medicine bazars of India. It exudes in he form of red juice from incisions in the bark. A single tree will often yield 60 gallons. In Brazil they use the bark of *Luhea panicula*, an vergreen climber, for tanning leather; and in Peru the bark of some species of *Weinmannia* erves the same purpose. Among other powerful stringents may be noticed the root of a species of Sea Lavender (*Statice Caroliniana*), *Myrica cerifera*, and *Heuchera Americana*, all natives of North America. Also the petals of *Hibiscus Rosa-sinensis*, a native of Asia. The sea-side grape (*Coccoloba uvifera*) yields an astringent substance known as Jamaica kino. The bark of the *Cassia auriculata*, and the milky juice of the *Asclepias giganlea*, are used for tanning in India. The black mangrove (*Rhizophora mangle*) is a tree attaining an altitude of from 30 to 50 feet, and occupying marshy situations in the vicinity of the sea. Almost every part of this mangrove—the bark, roots, and the fruit more particularly—abounds in an astringent principle, which is successfully applied to the purposes of tanning. As the tree is so abundant within the tropics, it might be worth the while of some practical speculator, to make an extract on the spot, and introduce it into the English market, for the use of tanners and dyers. For tanning, the mangrove is said to be infinitely superior to oak bark, completing in six weeks an operation which with the latter occupies at least six months, and the sole-leather so tanned is said to be more durable than any other. The bark and leaves, which contain nearly as much tannin as the oak, are made use of in the West Indies, as well as in Sinde and other parts of Asia. 3,713 piculs of mangrove bark, valued at £819, were shipped from Shanghae, one of the Chinese ports, in 1849. See MANGROVE also RHIZOPHORA.

Myrobalans.—This is a name applied to the almond-like kernels of a nut or dried fruit of which there are several sorts known in the East. They are the produce of various species of *Terminatia*, as *T. Bellerica*, *chebula*, *citrina*, and *angustifolia*. They vary from the size of olives to that of gall nuts, and have a rough, bitter and unpleasant taste. Many of the trees of this tribe, which are all natives of the tropical regions of Asia, Africa, and America, are used for tannin, and some for dyeing. They are highly valued by dyers, creating, when mixed with alum, a durable dark brown yellow. Myrobalans fetch in the Bombay market 8s to 26s. the Surat candy of 821 lbs. The bark and leaves of *T. Catappa* yield a black pigment, with which Indian ink is made; the seeds are eaten like almonds. A milky juice is said to flow from *T. angustifolia* which when dried, is fragrant, and, resembling Benzoin, is used as a kind of incense in the Catholic churches in the Mauritius. The fruit of *T. Belterica*, and of *T. Chebula*, both useful timber trees, indigenous to the East Indies, are used medicinally as a tonic and astringent. 117 cwts of myrobalans were shipped from Ceylon in 1845. The annual imports of myrobalans into Hull, amount to about 1,600 cwts. The quantity which arrived at Liverpool was 185 tons in 1849, 851 tons in 1850; 27,212 bags in 1851, and 19,946 bags in 1852; they come from Calcutta and Bombay, and are also used for dyeing yellow and black. The price in January, 1853, was 6s. to 12s. per cwt. The average annual imports into the United Kingdom may be taken at 1,200 tons.

Kino.—The Kino of commerce is the product of several trees (*see* Kino). The Kino of Botany Bay and Van Diemen's Land is the produce of the Iron Bark tree, *Eucalyptus resinifera.* White (Jour. of a voyage to N. S. Wales) says, this tree sometimes yields, on incision, 60 gallons of juice. Kino is imported in Boxes. That chiefly used as East Indian kino, is an extract formed by inspissating a decoction of the branches and twigs of the gambier plant. Vauquelin analysed it, and found it to consist of, tannin and peculiar extractive matter, 75; red gum, 24; insoluble matter, 1. The East Indian kino, imported from Bombay and Tellicherry, is the produce of *Pterocarpus marsupium* a lofty, broad-spreading forest tree, which blossoms in October and November. The bark is of a greyish color, and is upwards of half an inch in thickness on the trunk. When cut, a blood-red juice speedily exudes and trickles down; it soon thickens, and becomes hard in the course of fifteen or sixteen hours. The gum is extracted in the seasons when the tree is in blossom, by making longitudinal incisions in the bark round the trunk, so as to let the gum ooze down a broad leaf, placed as a spout, into a receiver. When the receiver is filled it is removed. The gum is dried in the sun until it crumbles, and then filled in wooden boxes for exportation. Another species, *Pterocarpus erinaceus*, a tree 40 to 50 feet in height, a native of the woods of the Gambia and Senegal, furnishes kino, but none is collected in or exported from Africa. *Butea frondosa*, or the dhak tree of the East Indies, furnishes a similar product, in the shape of a milky, colored, brittle, and very astringent gum. Some specimens of Butea kino, analysed by Prof. Solly, after the impurities had been separated, yielded 73¼ per cent of tannin. See Rhus.

(8062) TANPING. There is imported into Shanghae from the north of China, a great quantity of a dry paste, known, under the name of Tanping: the residuum or husk of a leguminous plant called "Teuss," from which the Chinese extract oil, and which is used after being pressed as manure for the ground.—*Simmonds.*

(8063) TANSY. Tanacetum vulgaris and *var.* crispum. The young leaves cut small, are used in coloring and flavouring puddings, omelets, cakes, &c. The curled *var*, T. cripsum in garnishing; succeeds on the plains of India, and grows freely in any good soil.—*Jaffrey.*

(8064) TAPIOCA, a form of Starch, prepared in South America from two species of *Janipha*, or the *bitter* and *sweet cassava* or *manioc* roots. From the facility with which the bitter cassava can be rasped into flour, it is cultivated almost to the exclusion of the sweet variety, which contains in its centre a tough fibious ligneous cord, which is absent in the bitter variet The latter, however, contains a highly acrid an poisonous juice, which is got rid of by heat o by fermentation, so that the cassava bread quite free from it. When the juice has bee carefully expressed, the fecula or flower is washed and dried in the air without heat, and form the Brazilian Arrow-Root of commerce; bu when dried on hot plates it becomes granula and forms Tapioca. An artificial Tapioca i made with gum and potato starch. The granule of this are larger, whiter, and more brittle an more soluble in cold water than genuine tapioca —*Tomlinson.* At the Madras Exhibition of 1855 Tapioca was exhibited by Mr. Rundall, of Razole near Rajahmundry, which in respect of fee and taste was excellent. It is manufactured b him at the rate of Rs. 7 8 0 per maund. Varirions other samples of Miscellaneous "Hill Tapioca" were exhibited—obtained from the root of different species of Arum, Dioscorea or Terrestrial Orchids: none of them appeared important, and from deficiency of exact information the jury were unable to enter into details, *Amorrphophallus companulatus* (Telinga Potatoe,) esteemed a very wholesome food, was likewise exhibited from Travancore, under the name o "karna kelungoo"—The large dark coloure flowers have a very curious appearance.—*M. E. J. R.* *Tapioca*, of late years, has been prepare in various parts of India of a superior quality from the roots of the *Jatropa manihot.*—*Faulkner.* See Arrow Root, also Cassava, also Janipha, also Iatropha, also Food.

(8065) TAPIRUS, *Tapir*, the name of a genus of Animals belonging to the family *Pachydermata* *Tapirus* has the following generic characters —Molars presenting on their crown before they are worn two transverse and rectilineal tubercles (collines); nose terminated in a small moveable proboscis, but not terminated with an organ of touch like that of the Elephant; neck rather long; skin rather thick, and covered with hair, looking as if it had been close shorn; two inguinal mammæ. Anterior feet with four toes; posterior feet with three toes. The species are found in Asia and America. The dental formula of the Asiatic species is as follow:—

$$\text{Incisors,}\frac{6}{6};\ \text{Canines,}\frac{1-1}{1-1};\ \text{Molars,}\frac{7-7}{6-6}=42$$

(8066) TAPIRUS MALAYANUS. (*T, Indicus* of the French zoologists; Le Maiba, F. Cuv., 'Mamm.'), the Asiatic Tapir. "The Malay Tapir resembles in form the American, and has a similar flexible proboscis, which is six or eight inches in length. Its general appearance is heavy and massive, somewhat resembling the Hog, The eyes are small; the ears roundish, and bordered with white. The skin is thick and firm, thinly covered with short hair. There is no mane on the neck, as in the American species. The tail is very short, and almost destitute of hair. The legs are short and stout; the fore feet furnished with four toes, the hind feet with three. In the upper Jaw there are seven molars on each side, one small canine inserted exactly on the suture of the incisor bone, and in front six incisors, the two outer of which are elongated into tusks. In the under jaw there are but six molars; the canines are large; and the number of the incisors, the outer of which are the smallest, is the same as in the upper jaw. The general colour is glossy black with the exception of the back, rump, and sides of the belly, which are white, and separated by a defined line from the parts that are black." (*Raffles*) The habits of this species in a state of nature are probably similar to those of the American Tapirs. In captivity, Major Farquhar describes it as of a mild and gentle disposition. "It became as tame and familiar as a dog; fed indiscriminately on all kinds of vegetables, and was very fond of attending at table to receive bread, cakes, or the like." Sir Stamford Raffles adds, that the living specimen sent from Bencoolen to Bengal was young, and became very tractable. It was allowed to roam occasionally in the park at Barrackpore, and the man who had charge of it informed Sir Stamford that it frequently entered the ponds, and appeared to walk along the bottom under water, and not to make any attempt to swim. Sir Stamford also states that the flesh is eaten by the natives of Sumatra. The individuals which have been exhibited in the Regent's Park Gardens have been very mild and gentle.—*Eng Cyc.*

(8067) TAR.

Goudron, Fr.
Theer, Ger.
Catrame, It.
Pix liquida, Lat.
Smola gesta, Pol.
Degot, Smola Shitkaja, Rus.
Tjara, Sw.

A thick black, unctuous substance, obtained by burning pine and fir trees in a close smothering heap, with a channel through which the tar exudes. It is extensively used for resisting moisture on wood, rope, &c., and is consequently in great request as a marine store. It is largely made in Russia, the United States, and Sweden.—*Faulkner*. Tar is chiefly employed for marine uses. Tar water was long a celebrated remedy, in the treatment of some chronic diseases of the lungs.—*O'Shaughnessy, page* 618.

(8068) TARAXACUM OFFICINALE, Dandelion. *Syn.* Leontodon Taraxacum. A native of Europe and the Himalayas. The inspissated juice of the plant, the infusion, decoction, and extract of the root, are strongly bitter, and prove tonic and diuretic, in large doses aperient. It is a favourite, and we believe useful remedy in the old hepatic diseases of persons who have long resided in India, and returned to a cold climate. The dose of the extract is 3 to 10 grains, thrice daily. For formulæ for infusion and decoction, *see Pharmacopœia.—O'Shaughnessy,p.* 407.

(8069) TARE, Fitch, Vetch. A species of pulse (*Vicia sativa*). Cultivated in Great Britain principally for its stems and leaves, which are used in the feeding of sheep, horses, and cattle; and partly also for its seed, which is used in the feeding of poultry.—*Faulkner*.

(8070) TARINE. A hard, fine, close-grained, rather heavy Ceylon wood, much resembling English birch.

(8071) TARSIUS. (Storr), a genus of Animals belonging to the family *Quadrumana*. It has the following characters:—Head rounded; muzzle short; eyes very large; posterior limbs very much elongated, with the tarsus thrice as long as the metatarsus. Tail long.

Dental formula:—Incisors $\frac{4}{2}$; Canines, $\frac{1-1}{1-1}$; Molars, $\frac{6-6}{6-6} = 33$.

(8072) TARSIUS BANCANUS. Dr. Horsfield remarks, that although the *Tarsius* from Banca agrees in the essential points with the other species of this singular genus which have hitherto been discovered, it has no intermediate front teeth, and the exterior tooth on each side is, compared with other species, very minute. Counting (with Desmarest) one canine tooth on each side, above and beneath, it has, says Dr. Horsfield, only five grinders in each jaw. The hands of this creature are small and delicate, and externally covered with a very soft down. Internally they are naked. The nails of all the fingers of the hand, as well as of the thumb and the third and fourth finger of the feet, are triangular, and represent a delicate compressed scale: on the index and middle finger of the feet they are erect, sharp, compressed, slightly curved and not inaptly compared by Mr. Fischer to the thorns of a rose-bush, constituting one of the essential characters of this genus. The body is handsomely formed, and, as in the other species, somewhat contracted towards the pelvis; the lower extremities also have in general a similar character, but the tarsus has less of the extravagant length which is common to the other *tarsii*. The fur is remarkably soft to the touch; it is compressed, of a thick and very delicate wool, which envelopes the body, head, and extremities, forming a coat of an unequal surface, from which irregular straggling hairs project; at the root of the tail, and at the hands of both extremities, it terminates abruptly in the form of a ring. The general colour is brown, inclining to gray; on the breast, abdomen, and interior of the extremities it is gray, inclining to whitish; a rufous tint is sparingly dispersed over the upper parts, which shows itself most on the head and extremities; the naked parts of the tail near the root are considerably darker than the extremity. ('*Zoological Researches in*

Java.') Dr. Horsfield obtained this animal in Banca, near Jeboos, one of the mining districts, where, he says, it inhabits the extensive forests in the vicinity.—*Eng Cyc.*

(8073) TARTAR (CRUDE), ARGAL, ARGOL. ORGOL.

Wynsteen, DUT.
Tartre-cru, Blanc et rouge FR.
Roher Weinstein, GER.
Tartaro volgare. IT.
Tartarus, LAT.
Tartaro, PORT.
Winnui kamen, RUS.
Tartaro, SP.

An acidulous salt, which exists in the juice of the grape, and is deposited in wine casks in the form of a crystallized incrustation more or less thick, which is crude tartar or argol. It is either white, or red, according to the colour of the wine; the former is preferred as it contains fewer impurities than the red; but the properties of both are essentially the same. When good, it is thick, hard, brittle, and brilliant, with but little earthy matter. It is obtained from Florence, Naples, Sicily, and Cape of Good Hope, and is used in hat-making, gilding, dyeing, and in the preparation of tartaric acid. (*Waterston.*) —*Faulkner.*

(8074) TEA.

Chai, ARAB.
Cha, Te, CHIN.
Chai, CASH.
Cha-i, DUK.
Te, DUT.
Thé, FR.
Thee GER.
Cha, Cha-ie, GUZ. HIND.
Te, IT.
Tsja, JAP.
Teh, MAL.
Cha-i, PERS.
Cha, PORT.
Tchai, RUS.
Te, SP.
Tchai, TURK.

The leaf of an evergreen shrub, a native of China and Japan; it is also cultivated in Java, Assam, Brazil, and other places; but at present the chief commercial source of tea is China, whence it is exported to different parts of the world.—*Faulkner.*

The Honorable Mr. Morrison says that the limits of his work could not admit of a full description of the various sorts of tea, or an account of their preparation; nor would the most minute details enable any one to select good teas, or supply that skill which practice gives in discriminating their qualities. An account of the cultivation of the plant, and mode of curing the leaves, together with some information respecting the different varieties of black and green teas, the origin of the names and other particulars relating to its sale and consumption, is contained in the Chinese Repository Vol. VIII pages 132-164, to which he refers the reader. In the Tabular statement, the total exportation of tea is put down at 350,000 peculs or forty millions of pounds, but it is probably nearer 427,500 peculs, or fifty-seven millions of pounds; viz. to England, 40,000,000 lbs.; to the United States 14,000,000 lbs.; and to all other countries, 3,000,000 lbs. which at 25 taels per pecul, instead of the 20 in the Statement, amounts to 10,687,500 tales, or $ 14,500,000. The present duty of 2 5t. exclusive of all shipping and other charges, which were before included in the total sum of 5 taels paid the hong-merchants as duty.—*Morrison.*

Tea statistics.—The immense traffic in the produce of this simple shrub, the growth of a remarkable country, for long almost entirely isolated from the western nations, is one of the most remarkable illustrations of the enterprise and energy of modern commerce. The trade in tea now gives employment to upwards of 50,000 tons of British shipping, and about ten millions sterling of English capital, producing a revenue to Great Britain of nearly six millions sterling.

Tea, its properties.—Every reflecting man will admit that articles of such vast consumption as tea and coffee (amounting together to more than 343,500 tons annually), forming the chief liquid food of whole nations, must exercise a great influence upon the health of the people. There is scarcely any country in the world in which a dietetic drink or beverage resembling tea, is not prepared, and in general use from some exotic or indigenous shrub. The two chief plants laid under contribution are, however, the Chinese tea-plant, and a species of holly peculiar to South America producing the Paraguay tea. *Astoria theiformis* is used at Santa Fe as tea. The leaves of *Canothus Americanus*, an astringent herb, have been used as a substitute, under the name of New Jersey tea. It has been a matter of surprise why tea should be so much sought after by the poorer classes, since by many it is looked on more as a luxury than of use to the human system. The manner in which it acts, and the cause why it is so much in demand by all classes, is satisfactorily explained by Liebig; and the benefit, therefore, which will be conferred by selling it at a low rate, and thus placing it within the means of all, has at last come to be duly appreciated. Liebig says, without entering minutely into the medical action of caffeine, theine, &c., it will surely appear a most striking fact, even if we were to deny its influence on the process of secretion, that the substance, with the addition of oxygen and the elements of water, can yield taurine, the nitrogenised compound peculiar to bile:—

		Carbon,	Nitrogen.	Hydrogen.	Oxygen.
1 atom caffeine or theine	=	8	2	5	2
9 atoms water........... ..	=	...	...	9	9
9 atoms oxygen	=	...	...	...	9
= 2 atoms taurine...		8	2	14	20
	=	2	4	9	10

Commerce in Tea.—The first tea imported into England was a package of two pounds, by the East India Company, in 1664, as a present to the king; in 1667, another small importation took place, from the company's factory at Bantam. The directors ordered their servants to "send home by their ships 100 pounds weight of best *tey* they could get." In 1678 were imported 4,713 lbs.; but in the six following years the entire imports amounted to no more than 410 lbs. According to Milborn's "Oriental Commerce," the consumption in 1711 was 141,995 lbs.; 120,595 lbs. in 1715, and 237,904 lbs. in 1720. In 1745 the amount was 730,729 lbs. For above a century and a half, the sole object of the East India Company's trade with China was to provide tea for the consumption of the United Kingdom. The company had the exclusive trade, and were bound to send orders for tea, and to provide ships to import the same, and always to have a year's consumption in their warehouses. The teas were disposed of in London, where only they could be imported, at quarterly sales. The act of 1834, however, threw open the trade to China. From a Parliamentary return, showing the quantity of tea retained for home consumption in the United Kingdom, in each year, from 1740 to the termination of the East India Copmany's sales, and thence to the present time, it appears that in 1740, 1,493,695 lbs. of tea were retained for home consumption. Two years afterwards, the quantity fell to 473,868 lbs. and in 1767 only 215,019 lbs. were retained. Next year the amount increased to 3,155,417 lbs.; in 1769 it was 9,114,854 lbs.; in 1795, 21,342,845 lbs.; in 1836, 49,842,236 lbs. The return in question also specifies the quantity of the various kinds of tea, with the average sale prices. According to the annual tea reports of Messrs. W. J. Thompson and Son, and Messrs. W. E. Franks and Son, the total imports into Britain of tea during the last fifteen years were as follows, reckoned in millions of lbs.:—

Years.		Black.		Green.		Total.		Home Consumption,
1838	....	26,786	...	8,215	...	35,001	...	36,415
1839	...	30,644	...	7,680	...	38,324	...	36,351
1840	...	21,063	...	7,161	...	28,224	...	31,716
1841	...	24,915	...	6,303	...	31,218	...	36,811
1842	...	31,915	...	9,729	...	41,644	...	37,554
1843	...	39,513	...	7,340	...	46,853	...	39,902
1844	...	39,644	...	8,749	...	48,393	...	41,176
1845	...	39,518	...	11,790	...	51,338	...	44,127
1846	...	44,017	...	12,486	...	56,503	...	47,534
1847	...	46,887	...	8,368	...	55,255	...	46,247
1848	...	37,512	...	7,611	...	45,123	...	48,431
1849	...	43,234	...	9,156	...	52,400	...	50,100
1850	...	39,873	...	8,427	...	48,300	...	51,000
1851	...	62,369	...	9,131	..	71,500	..	54,000
1852	...	55,525	...	9,175	...	64,700	...	54,724

Duty.—In England, duty on tea was gradually raised from 9d. per lb. in 1787 to 3s. a lb. in 1806. It was 2s. 2d. per lb. until May, 1852, when 4d. per lb. was taken off, and further annual reductions are to be made. Down to the year 1834 the duty was an *ad valorem* one of 96 per cent. on all tea sold under 2s. a lb., and of 100 per cent. on all that were sold at or above 2s., charged on the prices which they brought at East India Company's sales. The *ad valorem* duties ceased on the 22nd of April, 1834, and under the act 3 and 4 Willliam IV. c. 100, all tea imported into the United Kingdom for home consumption was charged with a customs duty as follows:—

Bohea	1s. 6d.	per lb.
Congou, twankay, hyson skin, orange pekoe and campoi	2 2	,,
Souchong, flowery pekoe, hyson, young hyson, gunpowder, imperial, and other teas not enumerated	3 0	,,

In 1836, the uniform duty of 2s. 1d. per lb. on all descriptions of tea was imposed, which, with the additional 5 per cent. imposed in 1840, made the total duty levied per lb. 2s. 2d. and a fraction.

Cost of Tea.—The average cost of tea in China at the ship's side is 10d. per pound, while it is confidently asserted that it could be produced in many parts of America at 5d. the pound. The great cost in China is owing to the expensive transportation, the cultivation of the fuel used, the absence of all economy of machinery, &c. It is only by adulteration that tea is sold in China as cheap as 10d. In America the heating and rolling of the leaves (one half of the labor) could be done by the simplest machinery, fuel could be economised by flues, &c. The Russian teas brought by caravans, are the most expensive and best teas used in Europe. The Chinese themselves pay 7½ dollars per pound for the "Yen Pouchong" teas. Full chests were exhibited in 1851, by Mr. Ripley, of various Pekoe teas, some of which fetch 50s. per lb. in the China market; whilst 7s. is the very highest price any of the sort will fetch in England, and this only as a fancy article. The plain and orange-scented Pekoes now fetch little with us; but all caravan teas are purchased by the wealthier Russian families. The finest, however, never leave China, being bought up by the Mandarins; for though the transit expenses add 3s. to 4s. per lb. to the value when sold in Russia, the highest market price in St. Petersburg is always under 50s. Among these scented teas are various caper teas, flavoured with chloranthus flowers and the buds of some species of plants belonging to the orange tribe, *Magnolia fuscata*, olea flowers, &c. The Cong Souchong, or Ningyoung teas, are chiefly purchased for the American market. Oolong tea is the favourite drink in Calcutta, though less prized in England, its delicate flavor being injured by the length of the voyage. For delicacy, no teas, approach those usually called "Mandarin teas," which being slightly fired and rather damp when in the fittest state for use, will bear neither transport nor keeping. They are in great demand among the wealthy Chinese, and average 20s. per lb. in the native market.—*Jury Report* of Ex. of 1851.

Consumption of Tea.—The consumption of tea in the United Kingdom may now be fairly taken at fifty-four million pounds yearly, and sold at an average price to the consumer of 4s. 6d., per pound. The money expended for tea is upwards of twelve millions sterling. The population of the Chinese provinces, as quoted by Dr. Morrison, from an official census taken in 1825, was 352,866,012, and we may fairly conclude that during the last twenty-eight years this population has extensively increased, If we multiply the population of China by four, we have—

	lbs.
Total consumption of tea in China	1,411,464,048
Export to Great Britain and Ireland, for the year ending June 30, 1851..................	64,020,000
Export to the United States, same period..........................	28,760,800
Exported to Holland, returned at 2,000,000 in "Davis's China."	3,000,000
Inland trade to Russia............	15,000,000
Export to Hamburg, Bremen, Denmark, Sweden, &c., seven cargoes, about....................	3,000,000
Export to Sydney, and Australasian Colonies, at least...........	6,000,000
Export to Spain and France, four cargoes..........................	2,000,000
Total lbs.	1,533,244,848

The above is exclusive of the heavy exportation in Chinese vessels to all parts of the east where Chinese emigrants are settled, such as Tonquin, Cochin China, Cambodia, Siam, the Philippines, Borneo, and the various settlements within the Straits of Malacca. In comparison with such an enormous quantity, the 54 million lbs. consumed in the United Kingdom sink into insignificance.

	£
The cost of tea to America, at the ship's side in China, say 29,000,000 lbs., at an average of 1s. per lb , would be......... .	1,450,000
The cost to England, 64,000,000, at the same price..................	3,200,000
The cost to other places, say 25,000,000.....	1,250,000
Russia, 15,000,000....................	750,000
Total...............	£6,650,000

Production of Tea.—It is important, in calculating what tea may be had from China, to consider the manner of its production. It is grown over an immense district, in small farms, or rather gardens, no farm producing more than 600 chests. "The tea merchant goes himself, or sends his agents to all the small towns, villages, and temple in the district, to purchase tea from the priests and small farmers; the large merchant, into whose hands the tea thus comes, *has to refire it and pack it for the foreign market.*'—(*Fortune's Tea Districts.*) This refiring is the only additional process of manufacture for the Foreign market. Mr. Fortune elsewhere, in his valuable work, giving an account of the cost of tea from the farmers, the conveyance to market, and the merchant's profit, states that " the small farmer and manipulator is not overpaid, but that the great profits are received by the middlemen."—*Simmonds.*

Habit. of Tea Plant.—Thunberg informs us that the Tea-plant grows plentifully in Japan both in a wild and cultivated state, and Dr. Wallich says that it is found in Cochin China. I have met with it says Fortune in cultivation in China, from Canton in the south up to the 31st degree of north latitude, and Mr. Reeves says it is found in the province of Sham-tung, near the city of Sang-chow-foo, in latitude 36° 30' north. page 272. The principal tea districts of China, however, and those which supply the greater portion of the teas exported to Europe and America, lie between the 25th and 31st degrees of north latitude, and the best districts are those between 27° and 31°.—*Fortune's Tea Districts, page* 272.

Tea districts.—The tea districts in China extend from the 27th degree to the 31st degree of north latitude, and, according to missionaries, it thrives in the more northern provinces. Kœmpfer says it is cultivated in Japan, as far north as 45 degrees. It seems to succeed best on the sides of mountains, among sandstone, schistus, and granite.—*Simmonds.*

The green-tea shrub is cultivated very extensively in the interior of the island of Chusan.—*Fortune, page* 117.

Mauritius, Bourbon, St. Helena, Cape.—Mr. Boyer, director of the museum at Port Louis, Mauritius, has succeeded in rearing 40,000 tea-trees, and expresses an opinion, that if the island of Bourbon would give itself up to the cultivation, it might easily supply France with all the tea she requires. The culture has also been commenced on a small scale, in St. Helena, and the Cape Colony. The cultivation of the tea-tree might be tried with probability of success in Natal, and the Mauritius. The plant grows in every soil, even the most ungrateful; resists the hurricanes, and requires little care. The picking of the leaves, like the pods of cotton, is performed by women, children, and the infirm, without much expense. The preparation is known to the greater part of the Chinese, of whom there are so many in Mauritius; besides, it is not difficult. A Mr. Duprat has planted a certain extent of land in the neighbourhood of Cernpipe, in that island, but I have not yet learnt with what success.

Cochin China.—The tea of Cochin China is considered inferior to that of China, being less strong and pleasant in flavour. An inferior sort of tea, with a leaf twice or thrice as large as that of Bohea, grows wild in the hilly parts of Quang-si, and is sold at from 12s. 6d. to 40s. the picul of 133 lbs.

Java.—The Dutch have devoted much attention to tea cultivation in Java, and the plantations are in fine order. Nearly a million lbs. of tea were shipped thence in 1848; but the tea is said to be of inferior quality, and grown and manufactured at considerable expense.

Japan.—Japan produces both black and green tea. The Japanese prefer the latter to the Chinese green tea. The black tea is very bad. The Japanese tea-tree, is an evergreen, growing in the most sterile places to the height of about six feet. It is described by Kœmpfer, as having leaves like the cherry, with a flower like the wild rose; when fresh, the leaves have no smell, but a very astringent taste. Tea grows in all the southern provinces of Japan, but the best green is produced in the principality of Kioto, where it is cultivated with great care.

Ceylon.—A few years ago, Messrs. Worms attempted the cultivation of tea in Ceylon. The Island, however, lies too far within the tropics to offer a climate like Assam, which is situate without them. The plants may thrive to appearance, but that is not a demonstration of their quality.

Pinang,—The tea-plant has reached upwards of six feet in height at Pinang, and in as healthy a state as could be desired, but the leaf had no flavor, and although thousands of Chinese husbandmen cultivated species, and other tropical productions on that island, no one thinks it worth while to extend the cultivation of the tea-plant in Pinang. The Chinese there laugh at the idea of converting the leaf into a beverage.

India.—Dr. Wallich mentions it in Cochin-China in N. lat. 17°, and in China in the southern provinces of Yunan and of Qung-tung. Mr. Reeves informed Dr. Royle that, in a Chinese Herbal, tea is said to be produced, among other places to the northward of 31°, in nine places in Hoo-Quang, three places in Ho-nan, one place in Shensi, and two places in Shantung; one of these latter, and the most northward of the whole, is Tangchow-Foo, in 36° 30' N. lat.—and in the Japan islands, which extend from 30° to 41° of N. lat., Dr. Abel states having found it in an apparently wild state at See-chou, in the province of Kiang-see, about N. lat. 26°, where the hills were covered with pines. Dr. Royle has, since the publication of his observations, seen an excellent specimen in flower in the British Museum, collected by another botanist (Mr. Cunningham) near Chusan, which is in 30° of N. lat. and where, he says, it delights on the tops of mountains like the pine. [This specimen was pointed out to Dr. Royle by Mr. R. Brown, distinguished as the first botanist of the day. The note attached to it is in the hand-writing of Cunningham. "Thea frutex flore albo rosaceo summitatibus montium gaudens uti pinus."—Herb. Mus., vol. xciii., fol. 146.] He further informs us, that "a plant was given to him at Suddiya, which he had reason to suppose was a genuine tea tree." Lieut. Charlton writes, on the 17th May, 1834, that he had been informed three years previously of the tea plants growing wild near Bheesa, whence indeed, he obtained three or four young trees, which he gave to Dr. John Tytler, to be planted in the Government Botanical Garden. On the 8th November, he sent to Calcutta some seeds and leaves of the tea trees of Assam, which were forwarded on the 24th December to the Government by the Tea Committee, who announced that "the tea shrub is beyond all doubt indigenous in Upper Assam, being found there, through an extent of country of one month's march within the Honourable Company's territories, from Suddiya and Beesa to the Chinese frontier province of Yunnan, where the shrub is cultivated for the sake of its leaf." So far back, however, as 1826, Mr. D. Scott sent from Munnipore, to Mr. G. Swinton, then Chief Secretary to the India Government, specimen of the leaves of a shrub which he insisted was a real tea. These we find were first discovered by Mr. Bruce, who was then in command at Suddiya. He sent tea seeds and plants to Mr. Scott, having been previously informed of their existence by his brother, the late Major Bruce; and he subsequently, in 1833, brought it to the notice of Capt. Jenkins.—(Tea Cultivation in India, p. 91.) Descriptions have been published by these gentlemen of the several tea tracts which they had at that time an opportunity of examining. These, according to Dr. Wallich, were five in number,—Koojo and Niggroo, among the Singpho, Nuddooa (Noadwar) and Tengrae, in the Muttuck country, and Gubroo, at the foot of the Naga Hills, in the territories of Rajah Purrendur Singh. The last, Dr. Wallich supposes, is connected with others to the southward, and with the tea plant originally announced as existing in Munnipore, and this, he says, may have originated from the plant at Hookum, and that all may have "originally travelled from the frontiers of China," where we know that a kind of tea is cultivated in the province of Yunan. Mr. Bruce, in his latest account, published in August 1839, in the Journal of the Asiatic Society, gives an account of the discovery of other tea tracts, which then amounted to no less than "one hundred and twenty, some of them very extensive, both on the hills, and in the plains." The hills on which tea has been found by Mr. Bruce, are the Naga Hills, and those of

Gubroo and Tipum.—*Royle's Productive Resources of India.* These discoveries were not lost sight of, and the Calcutta *Daily News* thus notices the half yearly report of the Assam Tea Company :—"The crop of Tea which in 1855 was 588,379 lb. and in 1856, 638,789 lb. is expected in 1857 to reach 700,000 lb. or nearly twenty times as much as the produce of the Government establishments in the North West in the fifteenth year of their existence. Nothing is said of the cost of the Tea ; but that was,we suppose, shewn in the accounts which were laid before the shareholders, but which have not been sent to us for publication. The whole of these Teas appear to have been hitherto shipped to England and those now arriving, will probably command extreme prices in consequence of the war with China. Should the notion be started at home that the Chinese may possibly medicate their Tea, there is no saying what prices may be paid for the Indian article, warranted genuine. The meeting by the secretary Mr. Elliot, read a letter from Dr. Jameson, Superintendant of the Botanical Garden at Saharunpoor, giving an account of the Tea plantations in the Himalayas. The encouragement given to the cultivation of tea in the last two years bids fair to render tea a staple article of produce in the N. W. Provinces. Last year the quantity turned out was 40,000 lbs. ; this year, that amount will be doubled. It is now in great demand at Almorah and Deyrah, the best kinds realizing from 3 Rs. to 4 Rs. 8 Annas per pound, and this not for small quantities, the amount disposed of having been 20,000 lbs. A great proportion of the second class teas was purchased by natives for the purpose of bartering with the Bhotiahs in the interior of the Himalayas and Thibet in exchange for Borax and other products of the Mountain region. Up to this time the Mountain races have been in the habit of consuming the brick teas of China. It is certainly a remarkable fact that an integral part of the Chinese Empire is receiving its supplies of tea from India, and Dr. Jameson is sanguine that if aided by good roads the trade with the Bhotiahs will soon become an important one, and that the Indian teas will be sold at rates so cheap as to drive the Chinese article out of the market in these regions.—*Calcutta Daily News*, 1857.

Introduction of Chinese plants into INDIA, *especially Assam and Himalayas.*—We have shown that it thrives equally well in the vicinity of Canton, and the milder climate of Nankin, as in the northern latitudes of Pekin and Japan ; embracing, therefore, a distribution over twenty degrees of latitude. The knowledge of this fact led to an inquiry in India, so long since as 1827, as to the practicability of introducing the culture of the tea-plant into the northern regions of that vast country ; and the result was an opinion of the Company's botanist, Dr. Royle, that it might be successfully grown in the north-western portion of the Himalaya districts. He pointed out some localities particularly suited to the experiment in the district of Kumaon, a portion of the province of Delhi, and situated between the 29th and the 30th degrees of north latitude, to the north-west of Nepaul. This opinion was afterwards backed by the investigations of others, who agreed in the belief that there was no impediment to the successful introduction of the tea-culture in the Himalayan regions beyond the difficulty of obtaining a supply of plants, and some details relative to the Chinese mode of cultivation and curing of the article. In 1834 Lord William Bentinck formed a committee, with the view of adopting measures for attempting this cultivation in India ; and the first step taken was the dispatch of agents to the tea districts of China, whence a supply of seeds and plants, and much valuable information was brought. Nurseries were formed in Calcutta, and some ten thousand plants were reared, the greater portion of which were dispatched to Kumaon, though but a small fraction of them reached the Himalayas ; whilst a quantity was forwarded to the hill districts of the Madras presidency, but without any commercial results. The plants dispatched northwards were distributed in several directions, and so well did they thrive, that in the year 1838 many of them had produced seed, which was at once sown, and thus formed fresh nurseries.

In the meantime the existence of the plant in a wild state had been ascertained in the upper districts of Assam, one of the north-eastern provinces of the Bengal presidency ; and inquiries having been directed to it, evidence was not long wanting to shew that the plant was growing in not less than a hundred different tracts amongst the dense jungles of that country. In 1837, samples of tea, prepared from the wild plants of the Assam district, were forwarded to Calcutta, and favourably reported on. Observations and researches instituted in the Assam country went to shew that the district really possessed most of the requisites of soil, position, altitude, and climate. Some valuable reports upon the peculiarities of this district, and the results of a number of experiments in the culture of the indigenous plants, were published at intervals between 1837 and 1840 ; and from these it appears that the best seasons for the manipulation of the tea-crop are in March, May, and July. Every inquiry goes to prove that the greatest success has been attained whenever the culture has been attempted on hilly slopes, or in the vicinity of rivers, with a temperature ranging from 27° to 80° ; indeed, it appears certain that the latter consideration is of far more importance than that of soil. The China tea-plants introduced into Upper Assam by the instrumentality of the Company's servants

ıve not only thriven remarkably well, but at-
ined a size and vigour unknown to them in
eir native soil. The first parcels of tea from
ese districts were highly approved of on their
rival in England, and realised enormous prices,
ırtly owing, in all probability, to their no-
lty. The result of these sales, however, plac-
it beyond a doubt that the cultivation of tea
uld be profitably carried on in that part of In-
a; and in consequence, a public company, en-
led the "Assam Company," was formed for the
ırpose of carrying on the culture and manufac-
re of British Indian tea on an extensive scale.
ıe East India Company having thus acted
e part of pioneers, handed over their experi-
ntal plantations and establishments to the new
npany, who have since greatly enlarged the
ntations and works, and have succeeded in
oducing a tea superior to any imported into
s country from China, and equalled only by
fewer samples which, under the old company's
stem, used to be occasionally obtained. Dur-
the first years of their operations, the Assam
mpany encountered many obstacles, arising
m the difficulty of procuring labour in suffici-
quantity, from the want of skill of their first
nagers, and, above all, from the extreme re-
teness of their property from all supervision.
e formation of a Calcutta committee had obviat-
the latter evil, whilst the remaining difficulties
re been successively overcome by patient per-
erance: and the company is now on a most
id foundation, having increased their extent of
ntation to twelve hundred acres, with a crop
1853 calculated at 300,000 lbs., which has
herto realised fully a third above the China
s. The produce of the company's tea-crop of
47 realised 9,728*l*. nett; that of 1848,
552*l*.; that of 1849, 16,628*l*.; that of 1850,
153*l*.; and that of 1851, as above stated,
,151*l*. The nett average price per pound
those years was, for 1847, 1*s*. 4*d*.; 1848,
5$\frac{1}{16}$*d*.; 1849, 1*s*. 6$\frac{13}{16}$*d*.; 1850, 1*s*. 6$\frac{2}{16}$*d*.;
l 1851, 1*s*. 8$\frac{1}{2}$*d*.

In the Himalayan districts the labours of
tea experimentalists have been equally
cessful with those carried on in the
re easterly province of Assam. About the
r 1842, the aid of some of the Chinese
tivators, who had been introduced in the
samese plantations, was obtained for tea-
ms in the Kumaon district of the Hima-
an country; and by their instrumentality a
ntity of black tea was produced and dis-
ched to Calcutta, whence it was shipped to
eat Britain, and pronounced superior in
ength and flavour to the generality of Sou-
ngs. By the end of the year 1844 these ex-
imental plantations contained upwards of a
ıdred thousand plants; and two years later
ered nearly two hundred acres, at various al-
ıdes, varying from 2500 to 6500 feet above
the sea-level. In the year 1848 this cultivation was still further extended, reaching to an extent of 1000 acres, not in one immediate neighbourhood, but stretching through many miles of country, and in some parts reaching the recently acquired Sikh territories on the north west frontier. The quantity of tea produced from these plantations must now be of some importance, and although the great distance of these districts from a port of shipment will always be a barrier to any successful competition with more favoured tea-producing countries, the supply of the local demand, already largely on the increase since this culture has commenced, will of itself prove a trade of no small value. So deeply impressed was the local government with the importance of this new branch of industry, that a grant of ten thousand pounds sterling a year was voted to carry out the experiment until it should, as in Assam, be taken up by private enterprise. In 1850 the East India Company, determined to lose no opportunity of fully testing the value of this cultivation, dispatched Mr. Fortune to China to glean all possible information regarding the tea-plant, its natural history, and the manipulation of its leaves; and, if possible, to bring away from the Chinese dominions a fresh supply of plants and seed of the best varieties, as also some experienced cultivators and work-people. In all these objects their agent was singularly fortunate, having but recently returned to India with a supply of all that was desired, in plants, seed, work-people, and, better still, in accurate data regarding the various processes of the cultivation and manufacture of this article.—*Capper's Three Presidencies, p.* 330.

Assam.—A company for the cultivation of tea, under the title of the Assam Company, was established in March, 1839; and which, with a called-up capital of £193,337, has, as our previous observations have shown, made, up to the present time very profitable progress; having now got its plantations into excellent cultivation, and all its arrangements in admirable working order, it has sold teas to the amount of £90,000, and has a steamboat, a considerable plant and machinery. In the report of the Company, at their annual meeting, held at Calcutta, in Jan., 1850, it was stated, as the result of their operations, that during the year 1849, the manufacturing season was unusually cold and ungenial, in consequence of which the development of leaf for manufacture was much checked. Although some loss was sustained, there was considerable increase in the crop notwithstanding, attributable to the continued improvements in the culture which had been obtained, and improvements over the previous season in some departments of the manufacturing process. The gross quantity of unsorted tea manufactured in the southern division was 207,982 lbs., being 2,973 lbs., less than that of the previous season, but the actual net out-turn was expected to reach 200,000 lbs.

As much as 157,908 lbs. of the crop had been already received and shipped to England. These teas consisted chiefly of the finer qualities. Whilst the crops have been thus sensibly advancing in quantity and quality, and the value of the Company's plantations permanently raised by extended and improved culture, and some increase to the sowings, the total outlay had been somewhat less than the previous year, the expenditure being limited to £500 for a crop of 21,000 acres of tea. With more extended gardens, the produce will be raised at a yet lower rateable cost than at present. The number of acres in cultivation in 1849, was about 12,000: these were not all in bearing, but would shortly be so, and the produce from this extent might be estimated at 300,000 lbs., and the cost of producing this would be about £11,000. 1,010 chests of the produce were sold in London on the 13th of March, 1850, at a gross average of 1s. 11½d. per lb. The produce of 1847, sold in England, was 141,277 lbs., at a gross average of 1s. 8d. per lb.: that of 1848 was 176,149 lbs. which sold at the average of 1s. 8½d. The produce of 1849 was 216,000 lbs., and there was every expectation of the average prices realised being higher than those of the previous years. The season was cold and unfavourable, or the crop would have been 10,000 lbs. more. The exact amounts obtained for the Company's teas in the five years, ending with 1851, will be seen from the following figures:—

	Net produce, lbs.		Average price.	£
1847 ...	144,164	at per lb. ...	1s. 7⅒d.	11,513
1848 ...	182,953	,, ...	1s. 8¼ d.	15,436
1849 ...	216,000	,, ...	1s. 9½ d.	19,350
1850 ...	253,427	,, ...	1s. 6⅛ d.	18,163
1851 ...	271,427	,, ...	1s. 8½ d.	22,152
1852estmd.	280,000			

This exhibits a progressive increase in the aggregate value of the Company's produce, and this has been effected, it is stated, without any sensible increase of the current expenditure. It exhibits also a rise in the value of the tea (157,942 lbs. having been sold at the high average price of 1s 11¼d.), a fact strongly indicative of its increasing excellence. The details of the crop of the season of 1849 showed a net produce of 237,000 lbs. of tea; so that the Company are increasing their cultivation to the extent of nearly ten per cent. per annum, and the increase will doubtless proceed with greater rapidity, whenever the increase of capital enables the directors to extend their operations. The prices in the years 1851, 1852, in London, have been fully maintained at 1s. 3d. to 4s. 4d., according to sorts. Of Assam tea, the sales in the London market in 1851 amounted to 2,200 packages, against 1,900 packages in 1850, and all were freely taken (on account of their great strength) at very full prices.

Kumaon.—Seventy-six packages of Kumaon tea, both black and green, grown by the East India Company, in the Himalayas, as an experiment, were, in 1851, also brought to sale. They were teas of high quality; but being of the light flavored class, and not duly esteemed in the English market, they realised only about their relative value as compared with China teas of similar grade. The Souchong and Pouchong sold at 1s. 1¼d. to 1s. 3½d.; the Hyson, Imperial, and Gunpowder realised 1s 7¾d. to 2s 6½d. Mr. Robert Fortune, who, in the service of the Horticultural Society of London, gave such satisfaction by his botanical researches in China, was, on his return to England, in 1848 engaged by the Directors of the East India Company to proceed again to the Celestial Empire, and procure and transmit to India such a quantity and variety of the tea plant, that its cultivation in the north-western provinces would be a matter of mere manual labor. Having penetrated about 300 miles into the interior, he left Hong Kong in the middle of 1851 for Calcutta with a large quantity of choice plants, selected in the green tea districts, and these have flourished as well as could possibly be expected; so that, in the course of a few years, there is every probability that tea will form a considerable article of export from our Indian Presidencies. Mr Fortune secured the services of, and took with him, eight Chinese, from the district of Weichow, under an agreement for three years, at the rate of fifteen dollars a month each. Six of these were regular tea-manufacturers; the other two were pewterers, whose sole business is that of preparing lead casings for tea-chests.

Punjab.—In the British portion of the Punjaub, it was, at first, resolved to expend £10,000 a year on the cultivation of the tea plant on the banks of the Beas, as well as at Anarkullee, and Kotghur in the Simla jurisdiction. Beyond the Beas there is a series of valleys on to Noonpoor, viz., the Palklun, Kangra, Rillo, &c., from 3,000 to 4,000 feet above the level of the sea, separated from each other by small ranges of hills. The valleys are from three to four miles in breadth, and from sixty to seventy in length: they are sheltered on the north by high mountains.—*Simmonds.*

India Tea Farms, Kumaon Plantations.

Mr. Fortune's Report 1856.

Bhurtpoor.—This place is situated eight or ten miles to the eastward of Nainee Tal, and is at an elevation of about 4,500 feet above the level of the Sea. It consists of a succession of terraces reaching from the bottom to the top of a small Hill; the soil is composed of light loam mixed with small pieces of clay-slate and trap or green stone, of which the adjacent rocks are chiefly composed. In 1851, when I visited this Plantation, it covered about four and a half acres of land. Since that time it has been extended down to the bottom of the Hill, and may now be about six acres in extent. The bushes are in excellent condition, and fully justify the favourable opinion I formed of the Plantation on my first visit. I then stated, in my Report to Government, that "both the situation and the soil of this Plantation are well adapted to the requirements of the Tea shrub." The centre portion of the land, about half way up to the Hill, is particularly worth pointing out as an example of what I consider most excellent soil for Tea cultivation. A large tract of land in the hills adjoining Bhurtpoor has been set apart for the extension of this farm.

Lutchmesir and Kuppeena.—These Plantations are on a Hill side near Almorah, about 5,000 feet above the level of the Sea, and together cover about seven acres of land. They were very favorably noticed in my former Report. The soil is light and sandy, and wherever it is of sufficient depth it is well adapted for Tea cultivation. The bushes, generally, are in good health, and for many years past have been yielding large crops of Tea. Of the two, Kuppeena is at present in the best condition; many of the plants in Lutchmesir appear to be getting too old and require to be renewed.

Hawulbaugh and Chullar.—These farms are situated about six miles North-West from Almorah, at an elevation of 4,500 feet above the Sea. In 1854, Dr. Jameson states that Hawulbaugh covered fifteen acres, and Chullar thirty. The former has always appeared to me well-adapted for Tea cultivation, both on account of the soil and also from its undulating character. As the best portions, and on which the bushes are in the finest order, I may direct attention to the ground from the large tank up to the Chinese tombs, and particularly to that between the tombs and the Carpenter's shops, and also to those portions South and West of this. The worst land on the farm is that on the West side of the Tea factory. In the Chullar farm adjoining, some portions of the higher land are in very good condition, such, for example, as those below the Tea factory and houses occupied by the Chinese; but the greater part is too wet. The water during the rains seems to ooze out everywhere, and would probably be difficult to drain. Perhaps the best method to adopt in the circumstances would be to plant only on dry land, and on land moderately rich and having a soil of sufficient depth. Land is abundant in all directions about Almorah, which is much better suited for Tea cultivation than most parts of Chullar.

Kutyoor.—A large tract of land has been taken up near the head of the Byznath Valley, about 35 miles Northward from Almorah. This land extends from a stream in the bottom of a valley up to the top of a Hill on the North side. Its surface is generally undulating in character, and consists of numerous ridges and furrows running from the top of the Hill down to the stream. The soil in this extensive tract of land varies much in its nature and composition. In some places it is a stiff clay, while in others it is loam, darkened and enriched by vegetable matter. A considerable portion of this farm seems well-suited for the cultivation of Tea. Wherever the soil is deep, moderately rich, and *not* marshy, the Tea plants, properly cultivated, will flourish admirably. A Plantation of great extent may be made here, if such portions only are selected and planted. But there are other parts of this farm—and extensive ones—on which it is not adviseable to attempt this cultivation.—*Fortune, 25th October* 1856, *Report in No.* 23. *Selections from the Records of the Government of India.*

Gurhwal Plantations, Guddowli.—This Plantation is in Eastern Gurhwal, near the village of Paorie, in Latitude 30° 8' North, and Longitude 78° 45' East. It consists of a large tract of terraced land extending from a ravine in the bottom of a valley to more than 1,000 feet up the sides of the mountain. The lower portion of this land is said to be about 4,300 feet above the Sea, while the top of the surrounding mountains are from 7,000 to 8,000 feet. In a large Plantation of this kind the soil is, of course, very varied in its composition. In some places it consists of a mixture of loam, sand, and vegetable matter, is deep, and altogether well-suited for Tea cultivation. In other parts it is stony, extremely shallow, and scarcely worth the expense of bringing under cultivation. Much of the higher portion of the farm, planted apparently within the last four or five years, is of this description. In the lower part of the Plantation, on spots where the soil is moderately deep and rich, the plants are succeeding very well and yielding fair crops of Tea. As an example of excellent Tea soil, I may point to a small portion of the Plantation lately planted about half a mile from the work-shops and out-houses on the road to the Overseer's house. Here the plants are growing admirably, and are quite equal to any Plantations of the kind I have met with in China.—*Fortune, 25th October* 1856, *Report in No.* 23, *Selections from the Records of the Government of India.*

Deyrah Dhoon Plantations, Kaolagir.—This farm is situated on the West side of Deyrah, and extends over 400 acres of land. The soil is composed of a mixture of clay, sand, and vegetable matter, varying in depth, but generally deep enough for Tea cultivation. It rests on a gravelly sub-soil, consisting of limestone, sand-stone, clay-slate, and quartz rock, or of such rocks as enter into the composition of the surrounding mountains. In consequence, I believe, of the suggestions contained in former Report, the system of cultivation has entirely changed. The trenches in which the plants were planted, were filled up, irrigation was discontinued, and more judgment was exercised in gathering leaves from very young plants. In fact the China system of cultivation was followed as far as it was understood, and the result of all this has been most satisfactory. The remarks I have to make upon the Plantation apply only to the Eastern portions of the farm and to the original nursery at the upper end. I have great pleasure in stating that I have never seen finer or more productive Plantations in China. The plants are in high health, large and bushy, and are yielding annually abundant crops of leaves. Many of the bushes are five and six feet in diameter. One I measured was eight feet, another ten, and both six feet in height. Of course these are the giants of the Plantation. And it is to be noted that these plants are not "drawn up" with few branches and leaves; but they are dense bushes in high health, and formed to give large quantities of Tea.—*Fortune*, 25*th October* 1856, *Report in No.* 23, *Selections from the Records of the Government of India.*

Punjab Plantations, Nagrowta.—This Plantation is situated in the Kangra Valley, about nine miles from the Old Fort, and covers apparently about four acres of land. It was planted in 1847, and consequently has been in full bearing for several years. In 1855 it produced 1,427lbs. of Tea, or about 330lbs. per acre. The soil is a brownish loam, moderately rich in vegetable matter, and well suited for Tea cultivation. The plants are healthy and vigorous.

Bowarnah.—This is another small experimental [Plantation further to the Eastward in the same valley, and about twenty miles from Kangra. It appears to be five or six acres in extent, and was planted about the same time as the former. It is consequently in full bearing, and yields annually upwards of 300lbs. per acre. It is to be remarked, however, that a considerable portion of the produce of both these Plantations is made up from old leaves, which had much better been left on the bushes. The soil of Bowarnah is a brown loam, not quite so rich as that at Nagrouta, but contains a larger portion of sand, and is equally well suited for the cultivation of the Tea shrub. This Plantation is also in a flourishing condition at present.

Holta.—The success which had attended these two small Plantations just noticed, induced the late Governor General, Lord Dalhousie, to comply with the wishes of Dr. Jameson to extend the cultivation of Tea in this part of the country. Accordingly, the lands at Holta were set apart for this purpose. Holta is about 26 miles North East from Kangra, at the foot of the high mountain range, and nearly 4,000 feet above the level of the Sea. Here snow falls annually and covers the ground for several days at one time. The high mountains behind are white with snow for the greater part of the year. The extent of this Plantation is stated to be about 1,200 acres, and of these 700 are already under cultivation. About 20 acres were planted in January 1852, 300 in 1853-54, and 380 in 1855-56. The condition of the plants upon this Plantation is highly satisfactory; they are healthy, vigorous, and quite equal to the best Plantations I have seen in China. Upon the whole, I am inclined to think this Plantation the most promising of all under Dr. Jameson's management, and it certainly reflects great credit both upon him and his Overseer, Mr. W. Rogers.—*Fortune*, 25*th October* 1856, *Report in No.* 23, *Selections from the Records of the Government of India.*

Future prospects of Tea cultivation in the Himalayas.—From the description which I have given of the Government Plantations it will be observed that the experiments have proved that the Hills in these Provinces are well adapted for the cultivation of Tea. And further, I believe that its cultivation, if carried on in a judicious manner, will prove an excellent investment for foreign capital. But a knowledge of the habits of the plant, and of agriculture or horticulture is in my opinion, indispensable to make success certain. In every trade and profession of life, a course of teaching is considered indispensable to success. The lawyer, the doctor, the farmer, and the gardener have all to devote long years of careful study to their profession before they will be trusted by the people whom they wish to serve. And I believe it is a rule with the Indigo Planters in Bengal and Tirhoot to make their young men study for some time on their estates before they can be entrusted with the entire management.

On the selection of Land and Cultivation.—It is a fallacy to suppose that Tea can be cultivated profitably on poor land where nothing else will grow. I drew attention to this point in my former Report, and stated that "Tea, in order to be profitable, requires a good sound soil: a light loam, well mixed with sand and vegetable matter, moderately moist, and yet not stagnant or sour," was instanced as most suitable for the requirements of the Tea shrub. There is no scarcity of such lands in the Himalayas, and if such are chosen, success is certain, in so far as the land is concerned. In many instances it would probably be cheaper to buy land from the Zemindars than to clear it. In taking large grants of hill land, the whole will rarely be found suitable for Tea cultivation. In this case those portions only should be cleared and planted where the soil is of such a nature as I have pointed out. *See Remarks on the Bhurtpoor and Kutyoo Lands.*

On plucking the leaves.—This, as I have already pointed out, is a very important part of the business, and requires to be carefully studied. Every vegetable physiologist knows that it is easy to render a plant unhealthy, or to destroy it altogether by continually depriving it of its leaves. Overseers and Tea Planters ought to study carefully the "Theory of Horticulture," a work of Professor Lindley. In my former Report I directed attention to the bad system of taking too many leaves from very *young plants*, and stated that, for the first two or three years, the leading shoots only should be topped, in order to *form* the plants and make them *bushy*. This has been adopted in the Government Plantations, and the good effects are apparent. But it is also necessary to bring the laws of vegetable physiology to bear upon plants which are fully grown. If too many leaves are annually taken from them, they will soon become sickly, stunted in appearance, and covered with dead branches. And thus the method adopted in order to obtain a large return, although apparently successful for a year or two, will *in the end defeat itself*. In China every child seems to possess intuitively the knowledge necessary to enable it to pluck leaves in the right way, and hence in that country the proper leaves only are taken, and the plants are rarely injured by over-plucking. The object the Chinese have in view is to obtain as large a quantity of leaves as the bushes are capable of yielding, not in any given year, but during the period of their existence; and although not vegetable physiologists, no one knows better than the Chinese that the way to accomplish this is by allowing the bushes to become fully developed, and to keep them in high health and vigour. The natives of India, at present, seem to have no idea of the importance of this principle, and consequently they do much harm to the bushes by over-plucking and by plucking in the wrong way. Instead of nipping off the upper part of the young shoot with its leaves, as the Chinese do, they strip the leaves from it and leave the bare stems. These bare stems generally die down to the nearest leaves, and then the plants get covered with dead stems and present a sickly appearance. Besides the injury this system inflicts on the plants *a great loss is sustained at the same time*. About an inch and a half, and some times more, of the top of the young shoots is soft and succulent, and makes just as good Tea as the leaves themselves. The Chinese know this well, and hence they always nip off this portion with the leaves. The natives of India have no idea of it, and they leave it to die upon the bush. In India large quantities of *old tough leaves* are also stripped from the bushes at each gathering. It is these leaves which form that coarse kind of Tea called "Bohea" at the Government Sales—a Tea totally unsuited for the foreign markets; and even the prices paid for it at the present time in India will not cover the expense of labor and packing. But although these leaves are worthless in Tea-making, they are invaluable to the health of the plants if left upon them, and therefore as few ought to be plucked as is possible. I have no doubt the time will soon come when the principal test of a good Overseer and a flourishing Plantation will be the small quantity of this so-called "Bohea." Since 1848, when I first went to China in the service of Government, large quantities of the best kinds of implements, in use in the Districts already named, have been imported for the use of the manufacturers and for models for imitation in India. Many thousands of Tea plants have also been introduced from these districts, and to these I beg to draw especial notice and to place on record the following remarks. They have been carefully treated and propagated extensively on the various Plantations by Dr. Jameson; but it is to be greatly feared that, in the changes which take place from time to time in Overseers, &c., they will become mixed up and confused with the original plants. I therefore suggest the propriety of taking effectual measures to prevent the possibility of this taking place, whatever changes may occur amongst Overseers or other workmen. It is just possible that the faults found by the London Brokers with Himalayan Teas may be remedied by the new and superior method of manipulation; but if the cause of this lies in the constitution of the original variety of the plant, then those obtained in the best Districts of China will prove of very great value. All the plants from the black Tea Districts ought therefore, to be kept together, and marked so that no mistake can by any possibility occur, and the same thing ought to be done with the plants from the green Tea Districts, marking particularly those from Hwuy-chow. The different Districts were carefully marked in the lists sent from China by me with the plants and seeds. When I visited these Provinces in 1851, I had some hopes that the Zemindars would speedily take to the cultivation of Tea on their farms, and that the Hill sides would soon be dotted over with small Plantations, such as one meets with in the Tea Districts of China. These hopes, I regret to say, have not yet been realized. There seems to be a deeply-rooted prejudice against the innovation which it may still take some years to overcome. One man, in particular, has acted in such an extraordinary and unaccountable manner that I cannot help noticing the circumstances in this Report. The circumstances in which this man was placed were altogether most favourable. Supposing the land to have been yielding annually 800lbs. of raw leaves per acre, which is a very low average, he would have been realizing Rupees 80 an acre for his land, or Rupees 640 for the 8 acres under Tea—a sum I should imagine twice as large as he would make from any other crop and with less trouble. Captain Ramsay has another Plantation on the old Sepoy Lines near Hawulbaugh. This is at present in most excellent condition and is most promising. If managed in a proper manner, it will be very valuable in a year or two. All that it requires at present is—*first*, to be kept clean; *secondly*, the plants *formed* by topping the leading shoots in order to make them *bushy*; and, *thirdly*, good drains made and kept open to carry off the springs, which in some places ooze from the Hill side. In two years more it will yield a large crop of leaves, and will go on yielding for many years. Although Tea cultivation amongst the Zemindars has not made much progress up to the present time, yet it is by no means to be regarded as hopeless. In all countries, it is difficult to induce the inhabitants to make any change in articles of cultivation, and the more ignorant they are, the more averse are they to any innovation. Even in England, in which there is perhaps less of this feeling now than in most other countries, every one can call to mind instances in which great improvements in agriculture were long retarded, owing to the ignorance and prejudice of the people. But although the introduction of Tea cultivation amongst the Zemindars may be slow at first, yet, in the end, it is almost certain to be adopted. And when once the prejudices which now exist against it have passed away, when a few have felt the advantage which such a crop is certain to confer upon them, others will speedily follow in their footsteps, and as in China, every village amongst these Hills will furnish its portion of Tea, the coarse kinds of which the natives will consume themselves, and the rest will be sold to merchants for consumption in the plains, or for exportation. The large amount of foreign capital, which will necessarily be brought into these Provinces to carry on Tea cultivation on an extensive scale, will be of very great importance to the people, and this alone is well worth the attention which Government has bestowed upon it. But although the resources of the country will thus be largely developed, and a good demand for labour established, these benefits will be slight when compared with those which would be conferred upon the inhabitants, could they be induced to cultivate and produce the article themselves. They would not only have, for their use, a simple and healthy beverage to drink, but it would also furnish them with the means of procuring a few of those harmless luxuries, which would have a tendency to raise their character, and to make them, as a people, more intelligent and industrious. At present, as a general rule, the natives of these Hills are lazy and indolent, and seem perfectly satisfied with a bare subsistence—indeed they can scarcely be said to enjoy the common necessaries of life. Their clothing is miserable in the extreme, and their dwellings would scarcely be considered fit for the lower kinds of animals, I will not say in England, but even in a half civilized country like China. If a change in the habits of the people could be brought about by the cultivation of Tea, such a famine as that which was felt in Kumaon and Gurhwal thi year is not likely to occur. But if a people ar so indolent as to allow their lands to lie waste or only half tilled—if they are content with thei daily bread and make no provision for the futur —a dry season such as the last may occur at an time when the crops fail and a famine is the re sult. Such a state of things could never tak place in China, at least from such slight causes because the Chinese feel that the necessaries an luxuries of life are indispensible to their happi ness, and they are industrious in order to suppl them. Another great advantage of Tea cultiva tion for the Hill farmers is this; it would neve fail to yield a crop, even in the driest seasons Last spring I had an opportunity of seeing al the Government Plantations in the dry weather and, when nearly every other crop had failed the Tea seemed uninjured. This is a fact o very great importance, and shows that, wit proper management, there is scarcely a chanc of failure even in the driest year. The poor i India are never likely to enjoy this healthy an refreshing beverage, until they can produce i themselves on their own lands, for the price wil be higher than they can afford to pay. It is fo these reasons I estimate so highly the importanc of Tea cultivation amongst the Zemindars in the Himalayas. I am quite sure that, notwithstanding the prejudices which exist in their minds against it at present, if the influential Officers of Government as a body were to encourage its cultivation, these prejudices would rapidly disappear. And when they have passed away,—when small Tea Plantations are seen dotted on every Hill side as in China—when the natives are met on the roads in large numbers carrying the produce of their little farms to the market towns, or to the factories of foreigners for sale,—a boon will have been conferred upon them of inestimable nature.—*Fortune, 25th October* 1856, *Report in No.* 23, *Selections from the Records of the Government of India.*

Tea plants: Are the Black and Green Teas from the same plant?—The plant in cultivation about Canton, from which the Canton teas are made, is known to botanists as the *Thea bohea*, while the more northern variety, found in the green tea country, has been called *Thea viridis*. The first appears to have been so named upon the supposition that all the black teas of the Bohea mountains were obtained from this species, and the second was called *viridis* because it furnished the green teas of commerce. These names seem to have misled the public, and hence many persons, until a few years back, firmly believed that black tea could be made only from *Thea bohea*, and green tea only from *Thea viridis*. In my "Wanderings in China,' published in 1846, I made some observation upon the plants, from which tea is made in different parts of China, while I acknowdged that the Canton plant, known to botanists s *Thea bohea*, appeared distinct from the more orthern one called *Thea viridis*, I endeavoured o show that both black and green teas could be nade from either, and that the difference in the ppearance of these teas, in so far as colour was oncerned, depended upon manipulation, and ipon that only. In proof of this I remarked hat the black tea plant found by me near Foo-how-foo, at no great distance from the Bohea ills, appeared identical with the green tea plant f Che-kiang.

It is now well known that the fine Moning listricts near the Poyang Lake, which are daily ising in importance on account of the superior haracter of their *black* teas, formerly produced nothing else but *green* teas. At Canton green nd black teas are made from the *Thea bohea* t the pleasure of the manufacturer, and accordng to demand.

Green tea.—When the leaves are brought in rom the plantations they are spread out thinly n flat bamboo trays, in order to dry off any uperfluous moisture. They remain for a very hort time exposed in this manner, generally rom one to two hours; this however depends nuch upon the state of the weather. In the nean time the roasting-pans have been heated vith a brisk wood fire. A portion of leaves re now thrown into each pan and rapidly moved about and shaken up with both hands. They re immediately affected by the heat, begin o make a crackling noise, and become quite noist and flaccid, while at the same time they give out a considerable portion of vapour. They emain in this state for four or five minutes, nd are then drawn quickly out and placed upon the rolling table. The rolling rocess now commences. Several men take heir stations at the rolling table and livide the leaves amongst them. Each takes s many as he can press with his hands, and nakes them up in the form of a ball. This is olled upon the rattan worked table, and greatly compressed, the object being to get rid of a portion of the sap and moisture, and at the same ime to twist the leaves. These balls of leaves re frequently shaken out and passed from hand to hand until they reached the head workman, who examines them carefully to see if they have taken the requisite twist. When he is satisfied of this the leaves are removed from the rolling table and shaken out upon flat trays, until the remaining portions have undergone the same process. In no case are they allowed to lie long in this state, and sometimes they are taken at once to the roasting-pan. Having been thrown again into the pan, a slow and steady charcoal fire is kept up, and the leaves are kept in rapid motion by the hands of the workmen. Sometimes they are thrown upon the rattan table and rolled a second time. In about an hour or an hour and a half the leaves are well dried and their colour has become *fixed*, that is, there is no longer any danger of their becoming black. They are of a dullish green colour, but become brighter afterwards. I am not now alluding to teas which are coloured artificially. The most particular part of the operation has now been finished, and the tea may be put aside until a larger quantity has been made. The second part of the process consists in winnowing and passing the tea through sieves of different sizes, in order to get rid of the dust and other impurities, and to divide the tea into the different kinds known as twankay, hyson skin, hyson, young hyson, gunpowder &c. During this process it is refired, the coarse kinds once, and the finer sorts three or four times. By this time the colour has come out more fully, and the leaves of the finer kinds are of a dull bluish green. It will be observed, then, with reference to green tea—1st, that the leaves are roasted almost immediately after they are gathered; and 2nd, that they are dried off quickly after the rolling process.—*Fortune's Tea Districts, pages* 272, 277, *and* 278.

Black tea.—When the leaves are brought in from the plantations they are spread out upon large bamboo mats or trays, *and are allowed to lie in this state for a considerable time.* If they are brought in at night they lie until next morning. The leaves are next gathered up by the workmen with both hands, thrown into the air and allowed to separate and fall down again. They are tossed about in this manner, and slightly beat or patted with the hands, for a considerable space of time. At length, when they become soft and flaccid, they are thrown in heaps and allowed to lie in this state for about an hour or perhaps a little longer. When examined at the end of this time, they appear to have undergone a slight change in colour, are soft and moist, and emit a fragrant smell.—*Fortune, Tea Districts, page* 278. The next part of the process is exactly the same as in the manipulation of green tea. The leaves are thrown into an iron pan, where they are roasted for about five minutes and then rolled upon the rattan table. After being rolled, the leaves are shaken out, thinly, on sieves, and exposed to the air out of doors. A framework for this purpose, made of bamboo, is generally seen in front of all the cottages amongst the tea-hills. The leaves are allowed to remain in this condition for about three hours: during this time the workmen are employed in going over the sieves in rotation, turning the leaves and separating them from each other. A fine dry day, when the sun is not too bright, seems to be preferred for this part of the operation. The leaves, having now lost a large portion of their moisture, and having become reduced considerably in size, are removed into the factory. They are put a second time into the roasting pan for three or four minutes, and taken out and rolled as before.—*Fortune, page* 279. The charcoal fires are now got ready. A tubular basket, narrow at the middle and wide at both ends, is placed over the fire. A sieve is dropped into this tube and covered with leaves, which are shaken on it to about an inch in thickness. After five or six minutes, during which time they are carefully watched, they are removed from the fire and rolled a third time. As the balls of leaves come from the hand of the roller they are placed in a heap until the whole have been rolled. They are again shaken on the sieves as before and set over the fire for a little while longer. Sometimes the last operation, namely, heating and rolling, is repeated a fourth time : the leaves have now assumed their dark colour. When the whole has been gone over in this manner, it is then placed thickly in the baskets, which are again set over the charcoal fire. The workman now makes a hole with his hand through the centre of the leaves, in order to allow vent to any smoke or vapour which may rise from the charcoal, as well as to let the heat up, and then covers the whole over with a flat basket. Previous to this the heat has been greatly reduced by the fires being covered up. The tea now remains over the slow charcoal fire until it is perfectly dry ; it is, however, carefully watched by the manufacturer, who every now and then stirs it up with his hands, so that the whole may be equally heated. The black colour is now fairly brought out, but afterwards improves in appearance : the after processes, such as sifting, picking, and refiring, are carried on at the convenience of the workmen. If the reader is desirous of obtaining more information upon this subject, he should consult Mr. Balls' 'Cultivation and Manufacture of Tea.' It will be remarked, therefore, with reference to the leaves which are to be converted into black tea,—1st, that they are allowed to lie for some time spread out in the factory after being gathered and before they are roasted ; 2d, that they are tossed about until they become soft and flaccid, and then left in heaps, and that this also is done before they are roasted ; 3d, that after being roasted for a few minutes and rolled, they are exposed for some hours to the air in a soft and moist state ; and 4th, that they are at last dried slowly over charcoal fires. The differences in the manufacture of black and green teas are therefore most marked, and I think fully account for the difference in colour, as well as for the effect produced on some constitutions by green tea, such as nervous irritability, sleeplessness, &c. This is shown in some observations made by Mr. Warrington, of Apothecaries Hall, in his paper which I have already quoted.—*Fortune, Tea Districts, page* 281.

Raw tea leaves.—That is, just as they had been plucked from the bushes, and unmanufactured, were also found by Fortune exposed for sale in the market. They were sold at from three farthings to five farthings a pound ; and as it takes about four pounds of raw leaves to make one pound of tea, it follows that the price paid was at the rate of threepence to fivepence a pound, but to this must be added the expence of manipulation. In this manner the inhabitants of large towns in China, who have no tea-farms of their own, can buy the raw leaves in the market and manufacture the beverage for themselves and in their own way.—*A Res. among the Chi. p.* 45.

Tea, Caper.—On entering one of the hongs or factories, says Fortune, the first thing to which we directed our attention was the tea which was to be made into "caper." I have already stated, he continues, that this description of tea is produced near a place called Tai-shan, in the Canton province, a few miles inland from the city. Here, it undergoes only the first process of manipulation ; that is, it is fired, rolled, and dried, and the colour fixed but nothing further is done to it. It is then packed up in mat-bags or baskets and sent down to Canton to be made up in the approved manner, and scented for exportation. On examining this tea, it has a very rough appearance, and in the state in which it was, seemed unsuited for the foreign markets. The workmen were busily engaged in remaking it during the time of our visit, and they went to work in the following manner : A convenient quantity, about twenty or thirty pounds, was thrown into the drying-pan, which had been heated for the operation. Here it was sprinkled with a basinful of water, and rapidly turned over with the hands of the workman. The dry leaves immediately imbibed the moisture and became soft and pliable. This softening process prevented them from breaking down into dust, and fitted them also to take any form which was considered desirable by the manipulator. The water used on this occasion stood in a large basin adjoining the drying-pans and had a yellow dirty appearance which Fortune was rather at a loss to account for. At first sight I thought it was mixed with some ingredient which was intended to give a peculiar tint or colour to the tea, but on inquiry it turned out that my conjecture was wrong. Our guide, on being appealed to for information on the subject, coolly informed us that "there was nothing in the water, it was quite clean, but that the workmen were in the habit of washing their hands in it !" As soon as the leaves had become softened by the moisture and heat in the pan, they were taken out and put into a strong canvas bag, and twisted firmly into a round form, resembling a football. This bag was then thrown down on the floor, which had been covered with a mat, and a man jumped upon it with both feet, supporting himself at the same time by laying hold of a bamboo pole, which had been erected in a horizontal position for the purpose. The heel, sole, and toes of his feet were now kept in perpetual motion, in turning and twisting the ball while the weight of his body compressed it gradually into a smaller size. As the bulk of the ball is thus reduced by pressure, the canvass slackens, and it is necessary for the workman from time to time to jump off it and tighten its mouth by giving it an extra twist with his hands. The balls by this process of rolling and twisting, become at last very hard and solid, and are then thrown on one side, and allowed to be in this state for several hours: if this work has been done in the evening, they remain all night. By this system of pressing, twisting, and rolling, the greater portion of the moist leaves take a circular form, which goes on to perfection during the subsequent drying which the leaves have, of course, to undergo, and ends in the production of the round shot-like appearance by which this kind of tea is known. It is a most curious sight to a stranger who sees the mode of making this tea for the first time. A whole row of these men, nearly naked when the weather is warm, each with a large ball under his feet, which he is twisting and rolling with all his might, is so unexpected a sight in tea-making. The clever sketch in his Frontispiece by his friend Mr. Scarth gives a good idea of this curious process. The best kind of caper takes the round form naturally during the manufacture of souchong or congou, but as I have already mentioned only a very small quantity, about five per cent. could be procured in this way. By far the greatest portion of the caper exported is manufactured in the manner I have just described. But as I am letting out all the secrets of tea manufacture I may just as well notice another mode of making caper which is scarcely as legitimate as the former. In one corner of the factory we observed a quantity of tea exceedingly coarse in quality, in fact the refuse of that which we had been examining. All the art of the manipulator, in so far as heating and pressing and rolling in the usual way, was not equal to make a good-looking "caper" out of this. The leaves were too old, too large and coarse in their present state. But although there might be some difficulty even to a Chinese in making small leaves into large ones, there was none whatever in making large leaves small and their mode of doing this was as follows. These coarse leaves were first of all heated and moistened as the others had been, in order to make them soft and pliable. They were then thrown into square boxes and chopped up for some time until the size of the leaves was reduced. When this was accomplished to the satisfaction of the operator they were then made into nice-looking round "caper" suitable for the market. The origin of the name this tea bears is no doubt from its resemblance in form to the flower buds of the caper-bush of the south of Europe, and yet it is rather a curious coincidence that the greater part of caper tea finds its market in the Cape of Good Hope. Our Chinese guide informed us, with a peculiar grin on his countenance, that when there is a large demand for green teas, caper is converted into imperial and gunpowder by dyeing it with prussian blue and gypsum. The "*orange pekou*" of commerce which is produced in the same district as the caper, is somewhat like congou in make but the leaf is much more wiry and twisted, and is of a lighter complexion. The infusion produced by this tea has a yellow or orange tint, and hence the name of orange pekoe which it bears. Like hyson pekoe amongst green teas, this is made from the young leaves soon after they unfold themselves in spring, and hence many of the leaves are covered with white hairs which are formed at this season of the year. These hairy leaves are called pekoe ends by the trade. A large quantity of this tea is gathered and dried by itself, while another portion is taken out of that of which the "caper" is ultimately made."—*A Res. among the Chi. page* 212.

Black Tea.—During the days of the East India Company's Charter all the best black teas were produced in the province of Fokien. The towns of Tsin-tsun and Tsong-gan in the vicinity of the far-famed Woo-e hills were then the chief marts for the best black teas exported by the Company. At that period the districts about Ning-chow, in the Kiangse province, were known only for their green teas. Now however. and for many years past, although the Fokien black teas are, and have been, largely exported, those produced in the Ning-chou districts have risen in the public estimation, and I believe, generally fetch very high prices in the English market. If there be any one now who still clings to the old idea that green teas can be made only from the plant called *Thea viridis*, and black ones only from *Thea bohea*, he will find a difficulty in giving credit to the account I have to give of the manner in which the Ning-chou districts have changed their green teas into black. But, however difficult it may be to get rid of early prejudices, facts are stubborn things and the truth of what I have to state may be fully relied upon. Many years ago a spirited Chinese merchant who, no doubt saw well enough, that black and green teas could be made easily enough from the same plant, had a crop of black teas made in the Ning-chow district and brought to Canton for sale. This tea was highly approved of by the foreign merchants at that port, and was bought, I believe, by the great house of Messrs. Dent and Company and sent to England. When it got home it found a ready sale in the market and at once established itself as a black tea of the first class. Year by year after this the demand for this tea steadily increased and was as regularly supplied by the Chinese. At the present time the Ning-chow districts produced black teas only, while in former days they produced only green. If proof were wanting, this would appear sufficient to show that black or green teas can be made from any variety of the tea plant, and that the change of colour in the manufactured article depends entirely upon the mode of manipulation.—*A Res. among the Chinese, page* 393.

Brick tea of Thibet.—A sample of this curious product was shown by the East India Company in 1851. It is formed of the refuse tea-leaves and sweepings of the granaries, damped and pressed into a mould, generally with a little bullock's blood. The finer sorts are friable masses, and are packed in papers ; the coarser sewn up in sheep's skin. In this form it is an article of commerce throughout Central and Northern Asia and the Himalayan provinces ; and is consumed by Mongols, Tartars, and Tibetans, churned with milk, salt, butter, and boiling water, more as a soup than as tea proper. Certain quantities are forced upon the acceptance of the Western tributaries of the Chinese Empire in payment for the support of troops, &c. ; and is hence, from its convenient size and form, brought into circulation as a coin, over an area greater than that of Europe.—*Dr. Hooker, in Jury Reports.* (*Simmonds*).

Tea, the varieties manufactured.—In order to give the reader some idea of the different sorts of teas manufactured for the European and American markets, I cannot do better than quote some excellent remarks on this subject by Sir John Francis Davis, in his work, “ The Chinese.” “ As tea has always held so principal a place in our intercourse with China, it requires some particular consideration as an article of commerce. We have seen before, that the fineness and dearness of tea are determined by the tenderness and smallness of the leaf when picked. The various descriptions of the Black diminish in quality and value as they are gathered later in the season, until they reach the lowest kind, called by us Bohea, and by the Chinese (Ta-cha), ‘ large tea’ on account of the maturity and size of the leaves. The early leaf buds in Spring, being covered with a white silky down, are gathered to make Pekoe, which is a corruption of the Canton name Pak-ho ‘ white down.’ A few days' longer growth produce what is here styled ‘ black leaved pekoe.’ The more fleshy and matured leaves constitute Souchong ; as they grow larger and coarser they form Congou ; and the last and latest picking is Bohea. Tea-farmers, who are small proprietors or cultivators, give the tea a rough preparation, and then take it to the contractors, whose business it is to adapt its farther preparation to the existing nature of the demand. The different kinds of tea may be considered in the ascending scale of their value.

1. Bohea, which in England is the name of a quality, has been already stated to be, in China, the name of a district where various kinds of black tea are produced The coarse leaf brought under that name to Great Britain is distinguished by containing a larger proportion of the woody fibre than other teas ; its infusion is of a darker colour, and as it has been more subjected to the action of fire, it keeps a longer time without becoming musty than the finer sorts. Two kinds of Bohea are brought from China : the lowest of these is manufactured on the spot, and therefore called “ Canton Bohea,” being a mixture of refuse Congou with a coarse tea called Woping, the growth of the province. The better kind of Bohea comes from the District of that name in Fokein, and, having been of late esteemed equally with the lower Congou teas, has been packed in the same square chest, while the old Bohea package is of an oblong shape.

2. Congou, the next higher kind, is named from a corruption of the Chinese Koong foo, ‘labour or assiduity.’ It formed for many years the bulk of the East India Company's cargoes ; but the quality gradually fell off, in consequence of the partial abandonment of the old system of annual contracts, by which the Chinese Merchants were assured of a remunerating price for the better sorts. The consumption of Bohea in Great Britain, has of late years increased, to the diminition of Congou, and the standard of the latter has been considerably lowered. A particular variety, called campoi, is so called from a corruption of the general name Kiew-peoy, ‘ Selection—choice’ ; but it has ceased to be prized in Great Britain, from the absence of strength, a characteristic which is stated to be generally esteemed beyond delicacy of flavour.

3. Souchong (Seaou-choong, ‘ small, or scarce sort’) is the finest of the stronger black teas, with a leaf that is generally entire and curly, but more young than in coarser kinds. What is called ‘ Padre Souchong’ is packed in separate paper bundles, of about half a pound each, and is so fine as to be used almost exclusively for presents. The probability is that its use in that way by the Catholic missionaries first gave rise to the name. The finest kinds of Souchong are sometimes scented with the flowers of the Chloranthus inconspicuus, and Gardenia florida ; and they cannot be obtained, even among the Chinese except at high prices. A highly crisped and curled leaf called Souchi, has lately grown into disrepute and been much disused, in consequence of being often found to contain a ferruginous dust, which was probably not intended as a fraud, but arose from the nature of the ground, where the tea had been carelessly and dirtily packed.

4. Pekoe being composed mainly of the young spring-buds, the gathering of these must, of course, be injurious in some degree to the future produce of the shrub, and this description of tea is accordingly both dear and small in quantity. With a view to preserving fineness of flavour, the application of heat is very limited in drying the leaves, and hence it is, that Pekoe is more liable to injury from keeping than any other sort of tea. There is a species of Pekoe made in the Green tea country from the young buds in like manner with the black kind; but it is so little fired that the least damp spoils it; and for this reason, as well as on account of its scarcity and high price, the Hyson-pekoe, as some call it, has never been brought to England. The mandarins send it in very small canisters to each other, or to their friends, as presents, under the name of Loong-tsing, which is probably the name of the district where the tea is made. Green teas may generally be divided into five denominations, which are 1. Twankay; 2. Hyson-skin; 3. Hyson; 4. Gunpowder; 5. young Hyson. Twankay tea has always formed the bulk of the green teas imported into England being used by the retailers to mix with the finer kinds. The leaf is older and not so much twisted and rolled as in the dearer descriptions: there is altogether less care and trouble bestowed on its preparation. It is, in fact, the Bohea of green teas; and the quantity of it brought to England has fully equalled three fourths of the whole importation of green. Hyson skin is so named from the original Chinese term, in which connection the skin means the refuse or inferior portion of anything; in allusion, perhaps, to the hide of an animal or the rind of fruit. In preparing the fine tea called Hyson all those leaves that are of a coarser yellow and less twisted or rolled appearance are set a part and sold as the refuse or skin tea at a much inferior price. The whole quantity, therefore, depends on, and bears a proportion to, the whole quantity of Hyson manufactured, but seldom exceeds two or three thousand chests in all. The word Hyson is corrupted from theChinese name which signifies flourishing spring, this fine sort of tea being of course gathered in the early part of the season.—*Fortune's Wandering, pages* 319, 220, 221 and 222.

Mr. Williams writing on the same subject says. Its botanical affinities ally it to the Camellia, and both have the same name among the Chinese; botanists call it Thea. and it is still a matter of dispute whether the different sorts are distinct species or mere varieties. Mr. Fortune found them growing together, and Loureiro, a medical missionary in China, regards all the varieties as ascribable, to these causes, though De Candolle divides them into three species, *Thea bohea*, *Thea viridis*, and *Thea cochinsinensis*. The plant is from three to six feet high, and usually presents a dense mass of foliage on an infinite number of small twigs, a result of the practice of cutting it down. In Assam where it has been found wild, it reaches the height of thirty feet. The leaf is a dark green color, of an oblong oval shape, and the flowers are white, inodorous, and single; the seeds are like hazel-nuts in size and colour, three of them being inclosed in a hard husk, and so oily as to corrupt soon after ripening; this oil is rather acrid and bitter, but is useful for various purposes.—*Williams, Vol.* 1, *page* 127.

The Chinese names given to the various sorts of tea the produce of these varieties, are derived for the most part from their appearance or place of growth; the names of many of the best kinds are not commonly known abroad. *Bohea* is the name of the Wu-i hills (or Bu i as the people on the spot call them), where the tea is grown, and not a term for a particular sort among the Chinese, though it is applied to a very poor kind of black tea at Canton; *Sunglo* is likewise a general term for the green teas produced on the hills in Kiangsu. The names of the principal varieties of black tea are as follows: *Pecco*, "white hairs," so called from the whitish down on the young leaves, is one of the choicest kinds and has a peculiar taste; *Orange Pecco*, called *shang hiang*, or "most fragrant," differs from it slightly; *Hungmuey*, "red plum blossoms," has a slightly reddish tinge; the terms *prince's eyebrows*, *carnation hair*, *lotus kernel*, *sparrow's tongue*, *fir-leaf pattern*, *dragon's pellet*, and *dragon's whiskers*, are all translations of the native names of different kinds of Souchong or Pecco. Souchong, or *siau chung*, means *little plant* or sort, as *Pouchong*, or *folded sort*, refers to the mode of packing it; Campoi is corrupted from *kan pei*, *i. e.* carefully fired; *Chulan* is the tea scented with the chulan flower, and applied to some kinds of scented green tea. The names of green teas are less numerous: *Gunpowder*, or *ma chu*, *i. e.* hemp pearl, derives its name from the form into which the leaves are rolled: *ta chu*, or "great pearl," and *chu lan*, or "pearl flower," denote two kinds of *Imperial; Hyson*, or *yu tsien*, *i. e.* before the rains, originally denoted the tenderest leaves of the plant, and is now applied to the *young Hyson;* as also another name, *mei pien*, or "plum petals;" while *hi chun*, "flourishing spring," describes *Hyson; Twankay* is the name of a stream in Chehkiang, where this sort is produced; and *Hyson skin* or *pi cha*, i. e. skin tea, is the poorest kind, the siftings of the other varieties; *Oolung*, "black dragon," is a kind of black tea with green flavor. Ankoi teas are produced in the district of Nganki, not far from Tsiuenchau fu, possessing a peculiar taste, supposed to be owing to the ferruginous nature of the soil. De Guignes speaks of the Pu-'rh tea, from the place in Kiangsu where it grows, and says it is cured from wild plants found there, the infusion is unpleasant, and used for medical purposes. The Mongols and others in the west of China prepare tea by pressing it when fresh into cakes like bricks, and thoroughly drying it in that shape to carry in their wanderings.—*Williams' Middle Kingdom*, *Vol.* II, *page* 135. The poorer natives substitute the leaves of a species of Rhamnus or Fallopia, which they dry; Camellia leaves are perhaps mixed with it, but probably to no great extent. The refuse of packing houses is sold to the poor at a low rate.—*Williams' Middle Kingdom*, *Vol.* II, *page* 136.

Manufacture.—The questions have been often discussed whether black or green teas are made from the same plant, and whether they can be made from each other. Chinese account ascribes the difference in the color of black and green tea wholly to the mode of preparation; green tea is cured more rapidly over the fire than the black, and not dried in baskets afterwards; but throwing the leaf into red hot pans, and subsequently exposing it to the sun and drying it over a covered fire makes it black. Green tea can therefore be changed into black, but the contrary cannot be done, because the leaf is already black. Green tea is made by simply drying the leaves, "young ones over a gentle heat and old ones over a hot fire, for about half an hour, or while two incense-sticks can burn out." By this mode more of the essential oil remains in the leaf, and is one reason, perhaps, why a greater proportion of green tea spoils or becomes musty during the long land journey to Canton. The tea cured for home consumption is not as carefully or thoroughly fired as that intended for exportation, and consequently probably retains more of its peculiar properties.—*Williams' Middle Kingdom*, *Vol.* II, *page* 133.

Testing of Tea.—Both kinds are repeatedly tested during the various stages of manufacture by pouring boiling water on a few leaves, to observe the color, aroma, taste, strength, and other properties of the infusion. As many as fifteen drawings can be made from the best leaves before the infusion runs off limpid. In the usual manner of Chinese writings ten things are specifically mentioned by the native author to be observed in selecting green tea; such as, that the leaf must be green, firmly rolled, and fleshy; there must be no petioles adhering, no dirty or broken leaves of twigs; and the infusion should be greenish, aromatic, and oily. In selecting all kinds of tea, the color, clearness, taste, and strength of the infusion are the principal criteria; the weight of the parcels, taste and color of the dry leaf, and its smell when strongly breathed upon, are also noticed. Some Aukoi teas are tried by a lodestone to detect the presence of minute particles of iron.—*Williams' Middle Kingdom.*

Soil suitable for its Cultivation. The soil most favourable for the growth of tea is a rich sandy earth, with a large proportion of vegetable mould in it, and situations on the sides of hills, where there is a good exposure and supply of water, produce the best flavoured leaves. The patches above the rice grounds are favorite situations, but the plant is seldom cultivated on the plains or lowlands. A loamy subsoil, with a sandy loose covering, produces a good crop of leaves and in the plantations visited in the Aukoi hills in Fuhkien, much of it is colored with iron. The greater part of the tea exported is grown in the provinces of Fuhkein, Chehkiang, and Kiangsu, but all the eighteen produce it, except in the northern regions lying along the base of the table-land in Chihli and Shansi, though the eastern parts, between the parallels of 25° and 35° north, afford it in the greatest perfection and abundance. With the increased demand its cultivation has extended, and perhaps that of cotton has diminished in a corresponding degree, the southern hills of Fuhkein, the western parts of Kwangtung, and districts in Kwangsi, also afford it for foreign markets. Russia is supplied from Szehuen and the adjoining region, while Birmah gets a part from Yunnan.—*Williams' Middle Kingdom*, *Vol.* 1, *page* 127.

Cultivation.—Tea is usually raised by individuals, who cultivate a few dozen or scores of shrubs upon their own lands, and either cure the leaves themselves, or sell them to their neighbours, after assorting them according to their quality. There are very few large plantations under the care of rich landlords, but each little farmer raises tea as he does cotton, silk, or rice upon his own premises. The seeds are thickly planted in nursery beds, because many of them fail from their oily nature, and when the nurslings are a foot or more high they are transplanted into rows about four feet apart; sometimes they are put in the spot designed for them, and if more than one seed in a hole succeeds, it is removed. No preparation of the ground is necessary, nor is much care taken to keep the shrubs in a healthy state; those near Canton are usually covered with lichens, and when thus neglected worms attack the wood. The leaves are picked from the plant when three years old, but it does not attain full size before six or seven, and thrives according to circumstances and care from fifteen to twenty years, being in fact gradually killed by constantly depriving it of its foliage. Pruning the twig to increase the quantity of leaves develops the branches laterally, so that large, healthy shrubs resemble a collection of plants rather than a single bush. The interspaces are frequently sown with vegetables, and the practice is to spread them as much as possible in order to prevent their being shaded. In the Bohea hills, where the best tea is produced, there is, according to the Chinese, considerable difference in the quality of the leaves from gardens not very far apart, and connoisseurs are as particular to inquire the name of the place whence their tea comes as western wine drinkers are to learn the names of the vineyards producing the best brands. The produce of old and celebrated nurseries is carefully collected and cured by itself, and one native authority states that the prices of these particular lots vary from $15 to $100 per pound.—*Williams' Middle Kingdom, Vol.* II, *page* 128. The annual produce of a single plant of large size is said to be from 16 or 18 to 24 ounces; but an English visitor to the Ankoi hills ascertained that the common average yield was not far from six ounces, and that a thousand square yards contained between 300 and 400 plants. Three crops of leaves are gathered during the season. The first picking is about the middle of April, or whenever the tender leaf buds begin to open, and while the leaves are still covered with a whitish down; these, though not very numerous, produce the finest tea, and the notion that some of the delicate sorts of tea are made from the flowers has originated from the whitish appearance this down imparts to them; for no tea can be made from the thin, scentless petals of the tea blossom. The second gathering is about the first of May, when the shrubs are covered with full-sized leaves. Chinese writers say that the weather has great influence upon the condition of the leaves, and that an excess or want of rain mildews or withers them, so as materially to affect the quality and quantity of the crop. When the proper time has arrived, a large number of hands should be employed to gather the leaves rapidly, and at this period the whole population, men, women, and children, find employment. Each person can on an average pick 13lbs. of leaves in a day, for which the wages are about six cents. The third crop is collected about the middle of July, and there is also a fourth gleaning in August, called *tsiulu*, i. e. autumn dew, rom the name of the season in which it takes place; the three previous ones called first, second, and third springs. The two last crops afford only inferior kinds, seldom exported.

Cultivation in China.—The tea-shrub is cultivated every where and often in the most inaccessible situations; such as on the summits and edges of precipitous rocks. Mr. Ball states that chains are said to be used in collecting the leaves f the shrubs growing in such places; and the greatest quantity is grown on level spots on the hill-sides, which have become enriched, to a certain extent, by the vegetable matter and other deposits which have been washed down by the rains from a higher elevation. Very little tea appeared to be cultivated on the more barren spots amongst the hills.—*Fortune, Tea Districts, page* 237.

Soil.—The soil of the tea-lands about Woo-e-shan seemed to vary considerably. The most common kind was a brownish-yellow adhesive clay. This clay, when minutely examined, is found to contain a considerable portion of vegetable matter mixed with particles of the rocks above enumerated. In the gardens on the plains at the foot of the hills the soil is of a darker colour, and contains a greater portion of vegetable matter, but generally it is either brownish yellow, or reddish yellow. As a general rule the Chinese always prefer land which is moderately rich, provided other circumstances are favourable. By far the greatest portion of the tea in this part of the country is cultivated on the sloping sides of the hills. I observed a considerable quantity also in gardens on the level land in a more luxuriant state even than that on the hill-sides; but these gardens were always a considerable height above the level of the river, and were consequently well drained.—*Fortune, Tea Districts, page* 255.

Cultivation and management of plantations.—In the black-tea districts as in the green, large quantities of young plants are yearly raised from seeds. These seeds are gathered in the month of October, and kept mixed up with sand and earth during the winter months. In this manner they are kept fresh until spring, when they are sown thickly in some corner of the farm, from which they are afterwards transplanted. When about a year old they are from nine inches to a foot in height, and ready for transplanting. They are planted in rows about four feet apart. Five or six plants are put together in each hole, and these little patches are generally about three or four feet from each other in the rows. Sometimes, however, when the soil is poor, as in many parts of Woo-e-shan, they are planted very close in the rows, and have a hedge-like appearance when they are full grown.—*Fortune's Tea Districts, page* 258. The young plantations are always made in spring, and are well watered by the rains which fall at the change of the monsoon in April and May. The damp, moist weather at this season enables the young plants to establish themselves in their new quarters, where they require little labour afterwards, except in keeping the ground free from weeds. A plantation of tea, when seen at a distance, looks like a little shrubbery of evergreens. As the traveller treads his way amongst the rocky scenery of Woo-e-shan, he is continually coming upon these plantations, which are dotted upon the sides of all the hills. The leaves are of a rich dark green, and afford a pleasing contrast to the strange and often barren scenery which is every where around. The natives are perfectly aware that the practice of plucking the leaves is very prejudicial to the health of the tea-shrubs, and always take care to have plants in a strong and vigorous condition before they commence gathering. The young plantations are generally allowed to grow unmolested for two or three years, or until they are well established and are producing strong and vigorous shoots: it would be considered very bad management to begin to pluck the leaves until this is the case. Even when the plantations were in full bearing I observed that the natives never took many leaves from the weaker plants, and sometimes passed them altogether in order that their growth might not be checked.—*Tea Districts, page* 259.

The Tea plant.—I must now make some observations upon the tea-plant itself. It has already been remarked that two tea-plants, considered to be distinct varieties, are met with in China, both of which have been imported into Europe. One, the Canton variety, is called *Thea bohea;* the other, the northern variety, is called *Thea viridis.* The former produces the inferior green and black teas which are made about Canton, and from the latter are made all the fine green teas in the great Hwuy-chow country and in the adjoining provinces. Until a few years back it was generally supposed that the fine black teas of the Bohea hills were also made from the Canton variety, and hence its name. Such, however, is not the case. When I visited Foo-chow-foo for the first time in 1845, I observed that the tea-plant in cultivation in that neighbourhood was very different from the Canton variety, and apparently identical with the *Thea viridis* of Chekiang. Foo-chow-foo was not a very great distance from the Bohea hills, and I had good reasons for believing that the Bohea plant was the same as the Foo-chow one; but still I had no positive proof. The tea-plant is multiplied by seed like our hawthorns, and it is perfectly impossible that the produce can be identical in every respect with the parent. Instead therefore of having one or two varieties of tea-plant in China, we have in fact many kinds, although the difference between them may be slight. Add to this, that the seeds of this plant are raised year after year in different climates, and we shall no longer wonder that in the course of time the plants in one district appear slightly different from those of another, although they may have been originally produced from the same stock.—*Fortune, Tea Disirict, page* 284. For these reasons I am of opinion that the plants of Hwuy chow and Woo-e are the same species, and that the slight differences observed are the results of reproduction and difference of climate. With regard to the Canton plant— both in constitution and habit, it too may have originally sprung from one and the same species.

These changes however, do not alter the commercial value of those plants found cultivated in the great tea-countries of Fokien and Hwuy-chow, where the finest teas are produced; for, while the tea-shrub may have improved in the course of reproduction in these districts, it may have become deteriorated in others. For this reason seeds an plants ought always to be procured from these districts for transmission to other parts of th world where it is desirable to grow tea.—*Fortune'* *Tea Districts, page* 285.

Cultivation at Hwuy-chow.—In the green-te district of Hwuy-chow, and I believe in al other parts where the shrub is cultivated, i is multiplied by seeds. The seeds are ripe i the month of October. When gathered the are generally put into a basket, and mixed u with sand and earth in a damp state and i this condition they are kept until the spring If this plan is not pursued only a small portio of them will germinate. Like the seeds of th oak and chesnut, they are destroyed when exposed to sudden changes in temperature an moisture. In the month of March the seeds ar taken out of the basket and placed in the ground They are generally sown thickly, in rows o in beds, in a nursery, or in some spare corner o the tea-farm, and sometimes the vacancies in th existing plantations are made up by sowing fiv or six seeds in each vacant space. Page 91 When the young plants are a year old they ar in a fit state for transplanting. This is always done at the change of the monsoon in spring when fine warm showers are of frequent occurrence. They are planted in rows about four fee apart, and in groups of five or six plants in the row. The distance between each group or patc is generally about four feet. The first crop o leaves is taken from these plants in the thir year. When under cultivation they rarely attai a greater height than three or four feet.—*Fortune* *Tea Districts, page* 91. When the winters ar very severe the natives tie straw bands round th bushes to protect them from the frost, and to prevent it and the snow from splitting them.

Tea Picking or Tea Harvest.—Mr. Fortun says, I made Ayukas temple my head-quarter for several days after the events took place whic I have related in the previous chapter. My tim was now fully occupied in visiting all the te farms in the neighbourhood, and in gettin information concerning the cultivation and manufacture of tea. It was the harvest-time for th principal crop of the season, and the natives wer observed on every hill-side busily engaged i gathering the leaves. These tea gatherers wer generally seen in small groups consisting of fro eight to twelve persons. One old man wa usually at the head of each group, the others bein women and children. Each had a small stool formed like the letter T, but broad of course at th top, for sitting on while gathering the leaves o the lower sides of the bushes. The foot stool bein pointed, it was easily forced into the ground i order to render it steady, and as easily drawn o and carried to a different spot. When these te gatherers are hired they are not paid by th day, but by the quantity of leaves they bring i to their employers. In making inquiries on the point I found they were paid at the rate of four and five cash a catty, and that they were able to gather from thirty to forty catty a day. In other words, each was able to gather from forty to fifty three pounds of raw leaves per day, for which was received from 6d. to 9d., or thereabouts. But it is only very expert and well trained hands that can make such a sum as this, hildren and very old people make, of course, something considerably less. Wages of labourers in the tea districts of China range from 2d. to 3d. per day with their food, which is almost always furnished by the farmers and which may ost about 3d. or 4d. more, making the whole lay's labour amount to 6d. or 7d. The food of his people is of the simplest kind—namely, rice egetables and a small portion of animal food,such as fish or pork.—*A Res. among the Chin. p.* 41.

Scenting of Tea.—Having taken a passing glance at all these objects on entering the building, I next, says Fortune, directed my attention to the scenting process, which had been the main object of my visit, and which I hall now endeavour to describe. In a corner of the building there lay a large heap of orange-lowers, which filled the air with the most deliious perfume. A man was engaged in sifting hem to get out the stamens and other smaller portions of the flower. This process was necesary, in order that the flowers might be readily ifted out of the tea after the scenting had been ccomplished. The orange-flowers being fully xpanded, the large petals were easily separated rom the stamens and smaller ones. In 100 parts 70 per cent. were used and 30 thrown way. When the orange is used, its flowers must be fully expanded, in order to bring out he scent; but flowers of jasmine may be used n the bud, as they will expand and emit their ragrance, during the time they are mixed with he tea. When the flowers had been sifted over n the manner described they were ready for use. n the mean time the tea to be scented had been arefully manipulated, and appeared perfectly ried and finished. At this stage of the process is worthy of observing that, while the tea as perfectly dry, the orange-flowers were ust as they had been gathered from the trees. arge quantities of the tea were now mixed p with the flowers, in the proportion of 40lbs f flowers to 100 lbs. of tea. This dry tea and he undried flowers were allowed to lie mixed toether for the space of twenty-four hours. At he end of this time the flowers were sifted out f the tea, and by the repeated sifting and winowing processes which the tea had afterwards o undergo they were nearly all got rid of. Someimes a few stray ones are left in the tea, and may be detected even after it arrives in England. small portion of tea adheres to the moist owers when they are sifted out, and this is generally given away to the poor, who pick it out with the hand. The flowers, at this part of the process had impregnated the tea leaves with a large portion of their peculiar odours, but they had also left behind them a certain portion of moisture which it was necessary to expel. This was done by placing the tea once more over slow charcoal-fires in basket sieves prepared for the purpose of drying. The scent communicated by the flowers is very light for some time, but, like the fragrance peculiar to the tea leaf itself, comes out after being packed for a week or two. Sometimes this scenting process is repeated when the odour is not considered sufficiently strong, and the head man in the factory informed me he sometimes scented twice with orange-flowers and once with the "Mo-le" (Jasminum sambac). The flowers of various plants are used in scenting by the Chinese, some of which are considered better than others, and some can be had at seasons when others are not procurable. I considered it of some importance to the elucidation of this subject to find out not only the Chinese names of these various plants, but also, by examining the plants themselves, to be able to give each the name by which it is known to scientific men in all parts of the world. The following list was prepared with great care, and may be fully relied upon. The numbers prefixed express the relative value of each kind in the eyes of the Chinese and the asterisks point out those which are mostly used for scenting teas for the foreign markets in the order in which they are valued. Thus the "Mo-le" and the "Sieu-hing" are considered the best and so on:—

1 Rose scented (Tsing moi-qui-hwa).
1 or 2 plum double (Moi-hwa)
2 *Jasminum sambac (Mo-le-hwa)
2 or 3 *Jasminum paniculatum, (Sieu-hing-hwa).
4 *Aglaia odorata, (Lan-hwa-or yu-chu-lan).
5 Olea fragrans (Kwei-hwa).
6 *Orange (Chang-hwa).
7 *Gardenia florida (Pak-sema-hwa).

It has been frequently stated that the Chloranthus is largely used. This appears to be a mistake, originating, no doubt, in the similarity of its Chinese name to that of Aglaia odorata. The Chloranthus is called "Chu-lan," the Aglaia "Lan" or "Yu-chu-lan." The different flowers which I have just named are not all used in the same proportions. Thus, of orange-flowers there are 40 lbs to 100 lbs. of tea; of Aglaia there are 100 lbs to 100 lbs.; and of Jasminum sambac there are 50 lbs. to 100 lbs. The flowers of the Sieu-hing (Jasminum paniculatum) are generally mixed with those of the mo-le (Jasminum Sambac), in the proportion of 10 lbs. of the former to 30 lbs. of the latter, and the 40 lbs. thus produced are sufficient for

100 lbs. of tea. The "Kwei-hwa" (Olea fragrans) is used chiefly in the northern districts as a scent for a rare and expensive kind of Hyson Pekoe—a tea which forms a most delicious and refreshing beverage when taken a la Chinoise without sugar and milk. The quantity of flowers used seemed to me to be very large; and I made particular inquiries as to whether the teas that are scented were mixed up with large quantities of unscented kinds. The Chinese unhesitatingly affirmed that such was not the case, but, notwithstanding their assertions, I had some doubt on this point. The length of time which teas thus scented retain the scent is most remarkable. It varies, however, with the different sorts. Thus the Olea fragrans tea will only keep well for one year, at the end of two years it has either become scentless, or has a peculiar oily odour which is disagreeable. Teas scented with orange blossoms and with those of the Mo-le will keep well for two or three years, and the sieu hing kinds for three or four years. The Aglaia retains the scent longer than any, and is said to preserve well for five or six years. The tea scented with the Sieu hing is said to be most esteemed by foreigners, although it is put down as second or third rate by the Chinese. Scented teas for the foreign market are nearly all made in Canton and are known to merchants by the names of "scented Orange," "Pekoe," and "scented Caper." They are grown in and near a place called Tashan, in the Canton province. Mr. Walkinshaw informs me that other descriptions of tea, both black and green, have been scented for the English market, but have been found unsuitable. True caper is to black tea what the kinds called "imperial" and "gunpowder" are to green: it assumes a round, short looking form during the process of manipulation, and it is easily separated from the other leaves by sifting or by the winnowing machine. It is a common error to suppose that "imperial" or "gunpowder" amongst green teas, or "caper" amongst black ones, is prepared by rolling each leaf singly by the hand. Such a method of manipulation would make them much more expensive than they are. One gathering of tea is said to yield 70 per cent. of orange pekoe, 25 of souchong, and 5 of caper. The quantity of true caper would therefore appear to be very small; but there are many ways of increasing the quantity by peculiar modes of manipulation, as I shall afterwards show. In a large factory, such as this at Canton, there is, of course, a considerable quantity of dust and refuse tea remaining after the orange pekoe, caper, and souchong have been sifted out of it. This is sold in the country to the natives at a low price, and no doubt is often made up with paste and other ingredients into those lie teas which now-a-days find a market in England. Nothing is lost or thrown away in China. The stalks and yellow leaves which have been picked out by women and children are sold in the country; while the flowers which have done their duty in the scenting process are given to the poor, who pick out the few remaining tea-leaves which had been left by the sieve or winnowing machine. Some flowers, such as those of the Aglaia for example after being sifted out from the tea, are dried and used in the manufacture of the "fragrant Joss-stick," so much used in the religious ceremonies of the country. It appears from these investigations that many kinds of fragrant flowers besides those used by the Chinese would answer the purpose equally well, and therefore in places like India, where tea is likely to be produced upon an extensive scale, experiments in scenting might be made with any kinds of fragrant jasmines, daphnes, aurantiaceous or other plants of a like kind indigenous to the country. It will be observed from the description just given that the method of scenting teas, like most of the arts in China, is exceedingly simple in its nature and most efficient. It used to be said by those who knew nothing about the matter, that "the flowers were put over a slow fire, with the tea in a separate basket above them, and so the fire drove the scent from the flowers into the tea." Knowing the immense capacity which dry tea has for moisture of any kind, how much more simple and beautiful is the process of allowing it to lie for a space of time mixed up with undried flowers! A few years ago I published a description of the Chinese mode of yielding green teas to suit our depraved tastes in Europe, and particularly in America, where they are largely consumed. Scenting teas is a very different thing, and nothing can be urged against the taste for them. That this is so in the eyes of the Chinese may be gathered from the fact that, while they dye their teas, not to drink, but only to sell, they consume and highly appreciate these scented ones. The price paid for flowers used in the scenting process varies, like everything else according to the demand or supply in the market. In 1854 and 1855, it was about seventeen dollars per pecul, but sometimes as much as thirty dollars are paid for the same quantity. In former years,—ten or twelve years ago,—as much as sixty dollars per pecul used to be paid for flowers. This information was given me some time after I had been examining the method of scenting in the Honan factory, and by another manufacturer and confirmed me in the opinion I had then formed, namely, that after the tea is once scented with the proportions of flowers mentioned above, it is mixed up with large quantities of unscented tea. Were this not so, the large quantity of flowers used would render the tea much more expensive than it really is. Upon making further inquiries, of different individuals and at different times, I found that my surmises were correct. The results of the information

thus obtained were, that sixty pounds of this highly-scented mixture were capable of scenting one hundred pounds of unscented tea, and no doubt it is sometimes used in even smaller proportions, the kinds called "Caper" and Orange Pekoe are quite different in appearance from teas made in the great black-tea provinces of Fokien and Kiang-si as large quantities of these teas—indeed, the whole which are exported—are made up near Canton.—*A Residence among the Chi. page* 198.

Tea is well known to the natives of Lahore and Cashmere; but the latter, are the more fond of tea, and prefer the Thibetan product to the English or even Chinese, notwithstanding the absence of aroma and perfume. The Bokharians and Russians are also fond of tea, and use generally the genuine Chinese production. The former make a soup of tea, by boiling the leaves, and then adding milk, salt and butter; a great cupful of this with bread, forms their daily breakfast. Both Russians and Bokharians drink generally tea without sugar, and chew the leaves afterwards, so that nothing is lost—*Thirty-five years in the East by Dr. Honig, page* 358.

Adulterations.—Before noticing these, Dr. Hassall repeats some of the information previously given. He tells us that the tea plant is a hardy evergreen and leafy shrub which attains the height of from three to six feet and upwards. It belongs to the natural family Columniferæ (Ternstrœmiaceæ of Lindley,) which includes the Camellias. It is generally propagated from seed and the plant comes to maturity in from two to three years, yielding in the course of the season three and in some cases four crops of leaves. The first gathering takes place very early in the spring, a second in the beginning of May, a third about the middle of June, and a fourth in August. The leaves of the first gathering are the most valuable, and from these Pekoe tea which consists of the young leaf buds as well as black teas of the highest quality are prepared. Those of the last gathering are large and old leaves and consequently inferior in flavour and value. The leaves vary considerably in size and form; the youngest leaves are narrow convoluted and downy; the next in age and size have their edges delicately serrated with the venation scarcely perceptible: in those of medium and large sizes the venation is well marked, a series of characteristic loops being formed along each margin of the leaf and the serrations are stronger and deeper and placed at greater intervals.

Varieties of Tea.—The principal varieties of *black tea* areBohea which is of the commonest and coarsest description, Congou, Souchong, Caper, and Padry Souchong and Pekoe, which are of the highest quality, the last consisting of the very young and unexpanded leaves and which when clothed with down constitute flowery Pekoe. The principal varieties of *green tea* are Twankay, Hyson-skin, young Hyson, Hyson Imperial, and Gunpowder, which in green tea corresponds with flowery Pekoe in black. Imperial Hyson, and young Hyson consist of the second and third gatherings, while the light and inferior leaves separated from Hyson by a winnowing Machine constitute Hyson-skin, a variety in considerable demand amongst the Americans.

Tea plant.—There is according to most writers but one species of the tea-plant from which the whole of the above and many other varieties of tea are obtained, the differences depending upon soil, climate, weather, age of the leaves and mode of preparation. The plants from which black teas are prepared are grown chiefly on the slopes of hills and ledges of mountains, while the green tea-shrubs are cultivated in manured oils. Upon this circumstance many of the differences between the two varieties depend. Other differences are occasioned by the processes adopted in the preparation and roasting of the leaves. Thus while *black tea* is first roasted in a shallow iron vessel called a "kuo" and secondly in sieves over a bright charcoal fire, *green tea* does not undergo the second method of roasting but only the first that in the "kuo."

An important part of the manufacture of tea consists in the rolling the leaves, so as to impart to them, their characteristic twisted shape. This is effected by subjecting the leaves to pressure and rolling by the hands in a particular manner. The first effect of the application of heat to the leaves in the Kuo is to render them soft and flaccid. When in this state, they are removed from the vessel and submitted to the first rolling, an operation which, after the renewed action of the Kuo on each occasion, is three for four times repeated with superior teas, before the process is considered to be complete.

Scenting of Tea.—The following observations on the scenting of tea are extracted from Mr. Ball's "Account of the Cultivation and Manufacture of Tea in China."

The Chinese seem universally to agree in ancient as in modern times that no factitious scent can be given to tea which at all equals its natural fragrance: in short they say that only common Tea requires scenting. Those persons who have had the opportunity of drinking some of the finest kinds of Souchong tea will perhaps agree with the Chinese in these opinions. There are however many scented teas which so far from being inferior are even costly and much esteemed both in China and in Europe. Of these the Chu Lan, or Cowslip Hyson, may be considered the best. "The tea about to be scented must be taken hot from the last roasting (which immediately precedes the packing, and poured into a Hyson chest so as to form a layer of two inches in height from the bottom, a handful or more of the fresh flowers (already separated from the stalks) is then strewed over the tea. In this manner the tea and flowers are placed in layers until the chest is quite full. The mouth of the canister is then closed and thus the tea remains for twenty-four hours. The proper proportion is three catties of flowers to one hundred catties of tea. The next day the chest is emptied when the tea and flowers are mixed together they then undergo the process of 'Poey,' about three catties being put into one sieve. The Poey Song is completely closed that the tea and flowers are thus roasted about from one to two hours or rather until the flowers become crisp. The flowers are then sifted out and the tea packed. If the tea require any further scenting, fresh flowers most be used and the process repeated as before. The tea thus prepared is then mixed with other tea in the proportion of one part of scented tea to twenty of plain. The whole is then slightly heated in a kuo (chao), and when packed constitutes the description of tea denominated in England Cowslip Hyson. Tea may be scented at any time with this kind of tea, but it must be previously heated or roasted about two hours. " The mode of scenting black tea differs from that of green, and, so far as I understand, there are two or three methods of performing this process. The Souchong or Caper teas, the Tetsiong and other teas of the Cowslip flavour, are also scented with the Chu Lan flower, *Chloranthus inconspicuus*. " After gathering, the flowers are separated from the stalk as before when some people dry them in the sun : but the best mode is to dry them in a Poey Song over a slow fire taking care not to change the yellow colour of the petals. When dried they are put aside to cool and are afterwards reduced to powder. If this powder, the scent of which is very powerful be sprinkled over the leaves previously to the last or two last roastings and rollings in the process of Poey, the tea will be highly scented, but this is an expensive mode, on account of the additional quantity of flowers required, and therefore is seldom practised. The usual mode is by sprinkling a small quantity of this powder over the tea during the last process of Poey, which takes place previous to packing. A small white powder frequently found in black teas of the caper flavour, cannot have escaped the observation of the tea dealers in England; this powder is that of the Chu Lan flower, whose colour has been changed to white in the process of Poey. " There is another scented tea of excellent flavour, which is made in small quantities and occasionally sent to foreigners as presents. This is a Souchong tea, scented with the flower of the ' Pae sheem' Gardenia florida.) " There are two other scented teas, also of fine flavour both Souchong teas, the one scented with the Quy-fa, or Kuey-hoe (Olea fragrans) and the other with the Moo-Ly-Hoa (Jasminum Sambac). Some people say that the three last teas are mixed with the flowers as the Hyson tea is mixed with the Chu Lan and are scented in the same manner. But others say that two sieves are placed in the Poey Song, the lower one containing the flowers and the upper one the tea. The latter is the mode in which the Pae Sheem tea to which I have previously alluded is scented. These are all the flowers with which I am acquainted which are employed to scent tea, but in the Keun Fang Pu, and Quang Tong Chy, or Canton Geographical History, many others are enumerated as eligible for that purpose. These works also observe that flowers so used should be full blown. M'Culloch, in his " Commercial Dictionary," draws an interesting parallel between the wine and the tea plant. " Considered as an object of agricultural produce the tea plant bears a close resemblance to the wine. In the husbandry of China it may be said to take the same place which the vine occupies in the southern countries of Europe. Like the latter its growth is chiefly confined to hilly tracts not suited to the growth of corn. The soils capable of producing the finest kinds are within given districts limited and partial. Skill and care both in husbandry and preparation are quite as necessary to the production of good tea as to that of good wine. " The best wine is produced only in particular latitudes as is the best tea, although perhaps the latter is not restricted to an equal degree. Only the most civilised nations of Europe have as yet succeeded in producing good wines, which is also the case in the East with tea, for the agricultural and manufacturing skill and industry of the Chinese are there unquestionably pre-eminent. These circumstances deserve to be attended to in estimating the difficulties which must be encountered in any attempt to propagate the tea-plant in colonial and other possessions. These difficulties are obviously very great and perhaps all but insuperable. Most of the attempts hitherto made to raise it in foreign countries were not indeed of a sort from which much was to be expected. Within the last few years however, considerable efforts have been made by the Dutch government of Java to produce tea on the hills of that island, and having the assistance of Chinese cultivators from Fokien, who form a considerable part of the emigrants to Java, a degree of success has attended them beyond what might have been expected in so warm a climate. The Brazilians have made similar efforts, having also, with the assistance of Chinese labourers, attempted to propagate the tea shrub near Rio de Janeiro, and a small quantity of tolerably good tea has been produced; but owing to the high price of labour in America, and the quantity required in the cultivation and manipulation of tea, there is no probability, even were the soil suitable, to the plant, that its culture can be profitably carried on in that country. It may perhaps succeed in

Assam where its culture is now being attempted, for labour is there comparatively cheap, and the hilly and table lands are said to bear a close resemblance to those of the tea districts of China; but we are not sanguine in our expectation as to the result." "All the black teas," says McCulloch, "exported (with the exception of a part of the Bohea grown in Woping a district of Canton) are grown in Fokien, a hilly, maritime, populous and industrious province, bordering to the north east on Canton. Owing to the peculiar nature of the Chinese laws as to inheritance, and probably, also in some degree to the despotic genius of the government, landed property is much sub-divided throughout the empire, so that tea is generally grown in gardens or plantations of no great extent. The leaves are picked by the cultivator's family and immediately conveyed to market, where a class of persons who make it their particular business purchase and collect them in quantities and manufacture them, in part, that is, expose them to be dried under a shed. A second class of persons commonly known in the Canton market as the tea merchants, repair to the districts where the tea is produced and purchase it in its half-prepared state from the first class and complete the manufacture by garbling the different qualities, in which operation, women and children are chiefly employed. A final drying is then given and the tea packed in chests and divided according to quality in parcels of from 100 to 600 chests each. These parcels are stamped with the name of the district grower, or manufacturer, exactly as is practised with the wines of Bordeaux and Burgundy, the indigo of Bengal and many others commodities; and from this circumstance get the name of chops, the Chinese term for a seal or signet. "The greater part of the tea is brought to Canton by land carriage, or inland navigation, but chiefly by the first, it is conveyed by porters, the roads of China in the southern provinces not generally admitting of wheel carriages, and beasts of burden being very rare. A small quantity of black tea is brought by sea, but probably smuggled, for this cheaper mode of transportation is discouraged by government, which it deprives of the transit duties levied on inland carriage. The length of land-carriage from the principal districts where the green teas are grown to Canton, is probably not less than 700 miles; nor that of the black tea over a mountainous country, less than 200 miles. The tea-merchants begin to arrive in Canton about the middle of October, and the busy season continues until the beginning of March, being briskest in November, December and January." There is another particular to which the comparison between the vine and tea plant made by Mr. M'Culloch may be extended, namely, the not less general use of the infusion made from the leaves of the tea plant by the people of various nations of both the old and new worlds. In China, as appears from the following extract, tea is the common beverage of the people. The late Sir George Staunton informs us that tea, like beer in England, is sold in public-houses, in every town, and along public roads and the banks of rivers and canals, nor is it unusual for the burdened and weary traveller to lay down his load, refresh himself with a cup of warm tea, and then pursue his journey." The wealthy Chinese simply infuse the leaves in an elegant porcelain cup, which has a cover of the same material; the leaves sink to the bottom of the cup, and generally remain there without inconvenience, though occasionally some may float or rise to the surface. To prevent this inconvenience sometimes a thin piece of silver, of filagree, or open work, is placed immediately on them. Where economy is necessary to be studied the teapot is used. The wealthy Japanese continue the ancient mode of grinding the leaves to powder; and after infusion in a cup, it is whipped with a split bambo, or denticulated instrument, till it creams, when they drink both the infusion and powder, as coffee is used in many parts of Asia."

Analysis of Tea.—The infusion made from tea contains gum, glucose or saccharine matter, a large quantity of tannin, and a peculiar nitrogenised principle called theine; this is identical with caffein, and upon its presence many of the properties of tea depend. The amount of gum and tannin contained in a given sample of tea afford data by which its quality may to some extent be determined.

Properties of Tea.—Lo Yu, a learned Chinese, who lived in the dynasty of Tang, A. D. 618 to 906, gives the following agreeable account of the qualities and effects of the infusion of the leaves of the tea plant.

"It tempers the spirit and harmonises the mind; dispels lassitude and relieves fatigue; awakens thought and prevents drowsiness; lightens or refreshes the body and clears the perceptive faculties." In Pereira's "Materia Medica" we find the following remarks relating to the properties of tea:—Its astringency is proved by its chemical properties. Another quality possessed especially by green tea, is that of diminishing the tendency to sleep. Tea appears to possess a sedative influence with regard to the vascular system. Strong green tea taken in large quantities, is capable in some constitutions of producing a most distressing feeling and of operating as a narcotic.

Adulteration of Tea. On the Use and Detection of Leaves other than those of the Tea plant.—It has been stated that the Chinese not unfrequently make use of the leaves of other plants besides those of tea and in particular the leaves of Camellia sasanqua and Chloranthus inconspicuus.

With La Veno Beno. This is an article which may be noticed in this place, being now very commonly sold under the above attractive title, to mix with tea. La Veno Beno consists of a coarse powder, of a reddish brown colour, intermixed with small fragments of a leaf which is stated to be that of sumach; to the taste the powder is astringent and bitter, and on analysis, it is ascertained to be composed in great part of coarsely powdered catechu.

Chinese Botanical Powder.—Like La Veno Beno, it is put up in packages, and sold at the same price; it consists of a coarse powder, of a reddish-brown colour and astringent taste, and is made up of a mixture of catechu and wheat-flour, the latter ingredient being added to reduce the strength of the catechu. *Its use is open to the same objections, sanitary and others, as La Veno Beno.*—From a consideration of the analysis of tea made by Dr. Hassall, it appears.—

1st. That not one of Thirty-five samples of black tea, as imported into England, contained any other leaf than that of the tea-plant.

2nd. That out of the above number of samples, twenty-three were genuine and twelve adulterated. The genuine teas were the Congous and Souchongs &c. and the adulterated teas, samples of scented Pekoe and scented Caper Chu'an or black gunpowder as well as imitations of these made from tea-dust.

3rd. That the adulterations detected consisted in facing, so as to improve the appearance of the teas, the surfaces of the leaves with black lead, an iridescent powder resembling mica, indigo, and turmeric, and in the manufacture of imitation tea out of tea dust, sand &c.

The second table which he framed affords conclusive evidence.

1st. That the fabrication of spurious black tea was extensively carried on at that time in the British metropolis, and in other towns of that kingdom.

2nd. That two processes of fabrication are adopted. In the first, the exhausted tea-leaves are made up with gum, and re-dried; black lead, and the mica-like powder, rose-pink, and carbonate of lime being sometimes added to bloom or face the leaves as well as sulphate of iron to darken the colour of the leaves and to give astringency. In the second, leaves other than those of tea (the kind matters but little) are used. These, after being dried, are broken down mixed with gum, catechu and made into a paste; the leaves are then re-dried and further broken down, and sometimes coated with gum. The spurious tea made from exhausted leaves is seldom sold alone, but is used either for mixing with genuine black, or is converted into green tea, in the manner to be described hereafter; while that made from British leaves and catechu is either mixed with black tea in the form of dust, or else is faced and bloomed, until it is made to resemble green tea.

From the Third table it appears,

1st. That out of twenty-four samples of blac tea purchased of tea dealers and grocers residen in the British metropolis, twenty were genuin and four adulterated, the former being Congou and Souchongs, and the latter samples of scente Pekoe and scented Caper. It thus appear that while the great bulk of the black tea use in England—viz, Congou and Souchong—a delivered to the consumer, is in a genuine state the scented teas—viz, the Pekoes and Capers—are invariably adulterated. Lastly, that from th extensive fabrication of spurious black tea i Great Britain, it is necessary that the purchase should be constantly on his guard.—*Hassell' Food and its adulterations, p.* 268.

Adulteration by artificial colouring in China.—The superintendent of the workmen managed th colouring part of the process himself. Having procured a portion of Prussian blue, he threw i into a porcelain bowl, not unlike a chemist' mortar, and crushed it into a very fine powder At the same time a quantity of gypsum wa produced and burned in the charcoal fires whic were then roasting the teas. The object of thi was to soften it in order that it might b readily pounded into a very fine powder in the same manner as the Prussian blue had been. The gypsum, having been taken out of the fire after a certain time had elapsed, readily crumbled down and was reduced to powder in the mortar. These two substances, having been thus prepared, were then mixed together in the proportion of four parts of gypsum to three parts of Prussian blue, and formed a light blue powder, which was then ready for use.—*Fortune's Tea Districts, page* 92. "This colouring matter was applied to the teas during the last process of roasting. About five minutes before the tea was removed from the pans—the time being regulated by the burning of a joss-stick, the superintendent took a small porcelain spoon, and with it he scattered a portion of the colouring matter over the leaves in each pan. The workmen then turned the leaves rapidly round with both hands, in order that the colour might be equally diffused. "One day an English gentlemen in Shanghae, being in conversation with some Chinese from the green-tea country, asked them what reasons they had for dyeing the tea, and whether it would not be better without undergoing this process. They acknowledged that tea was much better when prepared without having any such ingredients mixed with it, and that they never drank dyed teas themselves, but justly remarked that, as foreigners seems to prefer having a mixture of Prussian blue and gypsum with their tea, to make it look uniform and pretty, and as these ingredients were cheap enough, the Chinese had no objection to supply them, especially as such teas always fetched a higher price.—*Ibid page* 93. I took some trouble to ascertain precisely the quantity of colouring matter used in the process of dyeing green teas, not certainly with the view of assisting others, either at home or abroad, in the art of colouring, but simply to show green-tea drinkers in England, and more particularly in the United States of America what quantity of Prussian blue and gypsum they imbibe in the course of one year. To 4½ lbs. of tea were applied 8 mace 2½ candareens of colouring matter, or rather more than an ounce. In every hundred pounds of coloured green tea consumed in England or America, the consumer actually drinks more than half a pound of Prussian blue and gypsum. And yet tell the drinkers of this coloured tea that the Chinese eat cats, dogs, and rats, and they will hold up their hands in amazement, and pity the poor celestials." Two kinds of Prussian blue are used by the tea manufacturers one is the kind commonly met with, the other I have seen only in the north of China. It is less heavy than common Prussian blue, of a bright pale tint and very beautiful. Turmeric root is frequently employed in Canton, but I did not observe it in use in Hwuy-chow.—*Ibid page* 95. I procured samples of these ingredients from the Chinamen in the factory, in order that there might be no mistake as to what they really were. These were sent home to the Great Exhibition of 1851, and a portion of them submitted to Mr. Warrington, of Apothecaries' Hall, whose investigations in connexion with this subject are well known. In a paper read by him before the Chemical Society, and published in its 'Memoirs and Proceedings,' he says, "Mr. Fortune has forwarded from the north of China, for the Industrial Exhibition, specimens of these materials (tea dyes,) which, from their appearance, there can be no hesitation in stating are fibrous gypsum (calcined), turmeric root, and Prussian blue; the latter of a bright pale tint, most likely from admixture with alumina or porcelain-clay, which admixture may account for the alumina and silica found as stated in my previous paper, and the presence of which was then attributed possibly to the employment of Kaolin or agalmatolite."—*Fortune's Tea Districts, page* 95.

Green tea and its Adulterations.—According to most writers, there is but one species of tea plant from which the whole of the numerous varieties of tea both black and green are obtained, the differences in colour, quality &c., resulting from soil, climate, age of the leaves and mode of preparation. We have already pointed out in a very brief manner the principal difference in the cultivation and preparation of black and green teas. The plants from which black teas are prepared are grown chiefly on the slopes of hills and ledges of mountains, the leaves are obtained in three and in some cases even four gatherings, those of medium size and age being chiefly used for the great bulk of the black tea, viz. the congous and souchongs. They are dried either under covered sheds open at the sides, which is the best method, or else by exposure to the sun. This process is a somewhat lengthened one and during it a degree of fermentation is set up which is intimately associated with the colour, scent and flower of the leaves. Lastly the leaves are subjected to a double process of roasting first in a shallow iron pan termed a kuo, an operation which is repeated two or three times as may be necessary, and second in sieves called "poey longs" over a bright charcoal fire. The shrubs which furnish the leaves from which green tea is prepared are cultivated in manured or garden soils, the leaves are greener, more tender, and juicy, and two gatherings of them only are made, the first begins between the 20th of April and the 5th of May, and lasts for about ten or fifteen days,and the second at the summer solstice. After gathering, the leaves should be dried and roasted as soon as possible, in fact the same day, that is, before the slightest fermentation has had time to set in, all exposure to the air being unnecessary and to the sun injurious. During the roasting, which is repeated once or twice in the "kuo" only the second method viz: that in the poey long, not being practised the leaves are at the same time fanned to hasten the drying by dissipating the moisture which rises during the operation. The principal varieties of green tea are Twankay, an inferior description of Hyson, young Hyson; Hyson Skin,Gunpowder and Imperial; all these, except the Twankay, are obtained from unsorted Hyson or Mao Cha in the manner described by Mr. Ball.

In the analysis of black tea, several substances were found to be employed either for the purposes of facing and colouring the surface of the leaves or to impart astringency to the exhausted leaves. The substances ascertained were,

Starch,
Gum,
Catechu,
Sulphate of Iron,
Rose Pink,
Log wood,
Black Lead,
Talc,
China clay,
Soap-Stone,
Indigo,
Turmeric.

In addition to the above it has been ascertained that many other substances are employed. The colours used in the facing of green tree are usually three, yellow,blue, and white. The yellow and blue colours, when mixed, form a green, and white is added, either to lessen the intensity of the former colours, or else to give polish to the surface of the leaves. The following is a recapitulation of the more important results arrived at by Dr. Hassall in the course of his investigations. The chief points ascertained with regard to Black tea are,—

1st. That the principal black teas, namely, the Congous and Souchongs, arrive in England, for the most part, in a genuine state.

2nd. That certain descriptions of black tea as scented Orange, Pekoe and Caper are invariably adulterated, the adulteration in general consisting in the glazing of the leaves with plumbago or black lead; the Caper likewise being subject to admixture with other substances; as paddy husk, Lie tea and leaves other than those of tea.

3rd. That several varieties of a spurious Caper, or black Gunpowder, are prepared, which consist of tea dust, and sometimes the dust of other leaves and sand made up into little masses with gum, and faced or glazed with plumbago, Prussian blue, and turmeric powder. In some cases, these imitations are sold separately, but most frequently they are used to mix with, and adulterate the better qualities of Caper; viz. those which are made of tea faced with plumbago only. With respect to green tea, the principal conclusions are,

1st. That these teas, with the exception of a few of British growth and manufacture from Assam, are invariably adulterated, that is to say, are glazed with colouring matters of different kinds

2nd. That the colouring matters used are in general Prussian blue, turmeric powder, and China clay, other ingredients being sometimes but not frequently employed.

3rd. That of these colouring matters, Prussian blue, or ferro cyanide of iron, possesses properties calculated to affect health injuriously.

4th. That, in Great Britain, there is really no such thing as a green tea—that is, a tea which possesses a natural green hue.

5th. That green teas, and more especially the Gunpowders, in addition to being faced and glazed, are more subject to adulteration in other ways than black teas, as by admixture with leaves, not those of tea, with paddy-husk, and particulary with Lie tea.

6th. Lie tea is prepared so as to resemble green tea, and is extensively used by the Chinese themselves to adulterate gunpowder tea; it is also sent over to Great Britain in vast quantities, and is employed for the same purpose by English tea-dealers and grocers.

The above are the more important conclusions as to the condition of black and green teas, as imported, but these articles undergo further deterioration in our own country.

Thus has been adduced evidence to show,

1st. That exhausted tea leaves are frequently made up with gum, &c., and resold to the public as genuine black tea, and, when artificially coloured and glazed, even as green tea.

2nd. That the substances employed in the colouring are in many cases very much more objectionable and injurious than those used by the Chinese, being often highly poisonous.

3rd. That it is no uncommon thing for tea, both black and green, to be fabricated from leaves not those of tea, and possessing no properties in common with the leaves of that plant.

4th. That black Lie tea is often coloured an extensively employed by English dealers and grocers for the adulteration of green tea.—*Hassall'* *Food and its adulterations, page* 291.

Shevaroy Hills, Madras.—The experiment o growing tea in the Madras Presidency has bee often successfully tried, on a small scale. A number of plants supplied by government, throug Dr. Wallich, were planted in the Shevaroy hills about twelve or fourteen years since, and hav thriven well: but though no doubt is entertaine of the ease with which they could be propagate over a wide extent of country, no attempt has bee made to give the cultivation a practical turn, o to make a cup of tea from the southern Indi. tree.

Coorg.—In Coorg, too, the experiment ha been tested with like results, so that sufficien warranty exists to justify trials on the larges scale.

Java.—The Dutch have introduced the te plant in their rich and fruitful colony o Java. That island lies between the sixth an eighth degrees of south latitude. In 1828, the firs experiment in the cultivation of tea was made i the garden of the Chateau of Burtenzorg, at Java where 800 plants of an astonishing vigor, served as an encouragement to undertake this culture, and considerable plantations were made i many parts of the island. The first trials di not answer to the expectations, as far as regards the quality of the article, the astringen taste and feeble aroma of which caused the conjecture that the preparation of the leaf, and it final manipulation, are not exactly according t the process used in China. At present tea i cultivated in thirteen Residencies: but the principal establishment, where the final manipulatio is made, is in the neighbourhood of Batavia The tea which Java now furnishes yearly t the markets of the mother country, may be stated at from 200,000 to 300,000 pounds. It i intimated that the government intends to abandon this culture to the industry of private individuals, under the guarantee of equitable contracts. The mountain range, which runs throug the centre of the island, is the most productive because the tea gardens, extending from near th base, high up the mountains, reach an atmosphere tempered by elevation. The plant escape the scorching heats of the torrid zone, and finds climate, by height rather than by latitude, adapte to its nature. But the plant is not confined t lofty ridges. In the plains, the hedges an fences, if one may so call them, are all plante with the tea shrub, which flourish in greater o less perfection throughout the island. But, a has already been intimated, the equatorial latitudes are not the most auspicious for the vigorou growth of a plant that requires a temperatur equally removed from the extremes of heat an cold, and the quality of the tea is as much affect ed by the climate as the growth of the plant. A considerable quantity of tea is annually shipped from Java to Europe ; but the extension of the cultivation is no doubt checked by the exceeding fertility of the soil, and its adaptation to the growth of the rich products of tropical regions. Mr. Jacobson, inspector of tea culture in Java, has published at Batavia a work in three volumes, upon the mode of cultivating this plant, upon the choice of grounds, and the best processes for the preparation and manipulation of the leaves. This book, the fruit of many years of experience and care given to the subject, has been well received by the cultivators, who devote themselves to this branch of industry. If, by means of careful experiments and experience, the government succeed in conferring on the island of Java this important branch of commerce, she may hope to obtain brilliant results ; at all events, it will open to the country a new source of prosperity and riches.—*Simmonds.*

(8075) TEAK, TECTONA GRANDIS. Verbenaceæ, Roxb. C. 6.

Teak, ENG.	Teak Chettoo, TEL.
Teak marum, TAM.	Sagwan, HIND.

A native of the mountainous parts of Malabar and of the mountains bordering on the banks of the Godavery, above Rajahmundry, the Pegu, Moulmein and Rangoon forests. This well known and far famed tree grows straight and lofty, with cross armed panicles of showy, white flowers. It seems to require 80 yards to attain perfection The wood is very hard, but easily worked ; it is soon seasoned, and being oily, does not injure ron ; and shrinks little. It is probably the most durable timber known, hence its value in ship-building. The Malabar Teak is considered the *best,* and is always most valued in Indian Government dock yards. A valuable report by Dr. Falconer on the Teak forests of the Tenasserim Coast, was published lately among the Selections, rom the Records of the Bengal Government. The price of Teak-wood at present is 3 Rs. per cubic oot, double the ordinary rate. It is matter of egret considering the vast importance of teak imber to England, as a maritime nation, that the preservation of the teak forests was so long isregarded. (Wight No. 100, Mysore 2, Tinnevelly 2, 9, 63, 27, Coorg 11, Rajahmundry, Paulghaut 3, 23, 30, Bangalore 4, Mangalore 15 Travancore 64, 70, 254, Penang 130, 165, Canara 55.)—*M. E. J. R.* This most useful tree, n the Coromandel Coast, flowers in June nd July and the seeds ripen in September nd October. The wood of this tree has rom long experience been found to be by ar the most useful timber in Southern Asia ; is light, easily worked and at the same time oth strong and durable. That which grows on he mountains in the vicinity of the Godavery is ccasionally beautifully veined and mottled. For ship building purposes, Teak is superior to every other sort of wood, being light, strong, and durable, whether in or out of water. Pegu, produces the largest quantity and their navigable rivers enable the natives to bring it down to the sea ports at a cheap rate, which enables them to undersell that of any other part of India. This timber has been found ill adapted for Gun carriages. Indeed when it is observed how easily it splits, it is surprising that it had been for so many years applied to this purpose, especially for the felloes.

Godavery Teak.—The great depot for the Godavery teak is Coringa where many vessels are built, yet there it is found more profitable to plank vessels chiefly with teak brought from the opposite coast. Either from want of means of transport or the force of habit, the wood cutters about the Godavery cut short almost every log to a length of eighteen or twenty feet, and cut away one half of the thickness of the finest logs ; leaving three projecting pieces which are pierced for staples for convenience in lashing either to the yokes of the buffaloes or for conveying it from the forest or in rafts on the water. Some years since a wise enactment was passed for the Tenasserim provinces limiting a person cutting trees according to his means of transporting them. The Messrs. Palmer of Hyderabad at one time farmed teak forests, and sent down some very fine timber, but the speculation was given up as their agent at Neelapully was unable to obtain their prices. Government might easily prevent the waste noted by charging an exportation duty on all timber so hacked. It is strange that this waste is only in the teak timber, and not in inferior descriptions. In the Masulipatam and Rajahmundry district the timbers are classed as Tanabees 18 to 20 ft × 18 in. × 10 in. Toondoors 14 ft × 12 in diameter.—*Rohdes, M. S. S.*

At another place Mr. Rohdes observes, Teak is brought in large quantities from the country bordering the Godavery and its tributaries, and though the large logs are hacked away, when the Palmers of Hyderabad farmed the teak forests several of the finest trees felled by them within 100 miles of the coast remained from want of sufficient means of transport. *By a heavy duty on all logs hacked to waste, to the extent much of the timber is, Government would do much to preserve the supply.* Mr. Rohdes has seen several enormous teak logs washed down, clearly showing that even the banks of the rivers have not yet been deprived of their finest timber. A great deal of good timber, from 8 to 12 inches diameter, is brought to Masulipatam by carts returning from Nagpoor, the Chandah road to which runs for many miles through teak forests. The average price of teak at Rajahmundry is under 8 annas a cubic foot. It is classed as,

Tanebees, say 18 feet × 20 in × 8.
Toondoos 15 ,, × 12 in diameter.
Sirambees, 18 ,, × 8 in.

The Godavery teak varies much in density: much of it is finely veined; generally it is heavier than the Rangoon teak, but not equal to some from the Malabar Coast. In Ceylon, the Dutch largely planted teak, which has attained considerable size. Teak seems to require about 80 years to obtain perfection, but after 20 years a teak plantation would probably yield a valuable return in thinning.—*Rohdes.*

Malabar Teak.—Upon the whole, the Malabar teak seems the best. That of Rangoon is lighter and more open in the grain and is preferred for masts and spars. The dark or heavy teak of the mountains bordering on the Godavery is very little if at all inferior to the Malabar, but a good deal of the Godavery teak is very open grained. The logs brought to market are always irregular in shape. Where strength without any regard to size and shape is required, the small heavy logs brought down by return bullock carts to Masulipatam may be used. Major Campbell's experiments show the weight of a cubic foot to vary in the several specimens from 52 to 37 lbs, practical value of S. 92 to 50. Mr. Rohdes has frequently been struck with the want of strength in logs apparently sound, but has generally found the darkest veined wood the strongest. It is said that a varnish is extracted in Pegu from this tree.—*Rohdes, M. S. S.*

Tenasserim Teak —Teak is the staple timber of the Tenasserim Provinces, and from its abundance in Province Amherst, and its valuable property of being impervious to the white ants, it is used in Maulmain almost exclusively, both for building purposes, and for furniture. In 1848, eighteen thousand tons of this timber were exported, and Mr. O'Riley estimated that more than three thousand tons were used for home consumption; the total value of the whole falling little short of a million of rupees.—*Mason.*

The teak tree is of rapid growth, and the trunk grows erect, to a vast height, with copious spreading branches. The wood of the teak tree is by far the most useful timber in India; it is light, easily worked, and, though porous, it is strong and durable; it requires little seasoning, and shrinks very little: it affords tar of good quality and is rather of an oily nature, therefore does not injure iron, and is the best wood in this country for ship-timber, house carpentry, or any other work where strong and durable wood is required. Malabar teak is esteemed superior to any other in India, and is extensively used for ship-building at Bombay. It grows in the teak forests along the western side of the Ghaut Mountains, and the contiguous ridges, where the numerous streams afford water carriage for the timber. There is a variety, says Dr. Roxburgh, which grows on the banks of the Godavery, of which the wood is beautifully veined, closer grained, and heavier than that of the common teak tree; this kind is well adapted for furniture. The cohesive force of teak wood varies from 13,000 to 15,000 pounds per square inch; the weight of its modulus of elasticity is 2,167,000 pounds per square inch, according to Mr. Barlow's experiments; and the weight of a cubic foot seasoned, varies from 41 to 53 pounds.

Representing the strength of oak by 100,
that of teak will be, 109
Stiffness of oak by 100, ,, 126
Toughness of oak by 100, ,, 94

From which it appears, that it is much superior to oak in these properties, except in toughness; but it is to be remembered, that these proportions, are drawn from two or three experiments on teak, and most probably these were tried on very select specimens; whereas those for oak from a mean specimen, selected from pieces of oak of various qualities.—(*Tredgold?*) Teak-wood, says Tredgold, is the produce of the Tectona grandis, a native of the mountainous parts of the Malabar coast, and of the Rajahmundry Circars as well as of Java, Ceylon, and the Moulmein and Tenasserim Coasts. It grows quickly, straight, and lofty, the wood is light and porous, and easily worked, but it is nevertheless strong and durable; it is soon seasoned, and being oily, does not injure iron, and shrinks but little in width. Its colour is light brown, and it is esteemed the most valuable timber in India for ship-building and house-carpentry, it has many localities. The Malabar teak which grows on the western side of the Ghaut mountains is esteemed the best and is always preferred at Government dock-yards. Teak is considered a more brittle wood than the Saul or the Sissoo. In 25 years, the teak attains the size of two feet diameter, and is considered serviceable timber, but it requires 100 years to arrive at maturity. There is a variety, says Dr. Roxburgh, which grows on the banks of the Godavery in the Deccan, of which the wood is beautifully veined, closer grained and heavier than the common teak tree, and which is well adapted for furniture. Some of the old trees have beautiful burrs, resembling the Amboyna, which are much esteemed. I have an excellent specimen of the burr of the teak-wood, through the kindness of Dr. Horsfield, of the East India House. Wood in general does not very perceptibly alter in respect to length; Teak, says Colonel Lloyd, is a remarkable exception. He found the contraction in length, in the beams of a large room he erected in the Mauritius, to be three quarters of an inch in 38 feet. The teak-wood when fresh has an agreeable odour, something like rose wood, and an oil is obtained from it. He adds, "The finest teak now produced comes from Moulmein and other parts of Burmah ; some of this timber is unusually heavy and close grained, but in purchasing large quantities, care must be taken that the wood has not been tapped for its oil, which is a frequent custom of the natives, and renders the wood less durable." "At Moulmein, so much straight timber is taken and the crooked left, that thousands of pieces called shin logs," and admirably adapted for ship timbers, are left. Teak contains a large quantity of siliceous matter, which is very destructive to the tools. African teak does not belong to the same genus as the Indian teak ; by some it is thought to be a Euphorbiaceous plant and by Mr. Don to be a Vitex.—*Tredgold.* Teak, says Edye, has been brought into use in the British navy at Bombay, Calcutta, and Cochin. The following is a list of the ships of war built of this timber :—

Ships of the Line.—Minden, Cornwallis, Melville, Malabar, Wellesley, Ganges, Asia, Bombay, Calcutta, Hastings.

Frigates.—Salsette, Amphitrite, Trincomalee, Seringapatam, Madagascar, Andromeda, Alligator, Samarang, Herald.

Sloops.—Victor, Cameleon, Sphynx, Cochin.

It has been considered by many, that a ship built of this sort of wood would last good from thirty to fifty years, for which time, report says, many ships have been known to run in India. The old Milford Bombay ship, in the country trade of India, was the oldest and best-conditioned ship that ever came under Mr. Edye's notice. She was, he says, built of teak-timber about thirty-five years before I saw her ; she had been constantly at sea, and only had a small repair during that period. She was built of the Malabar teak. It is generally considered that there are three sorts of teak. That sort which grows to a very large size is of an open, porous grain, and very much resembles Dantzic oak : it is found in the forests at the foot of the Ghats ; in valleys where the soil is deep and rich ; and on the banks of great rivers. On the bank of the Iruarri river, near the Ghauts, about eighty miles from Cochin, he caused a tree of teak to be felled. It was seven feet in diameter, and at seventy feet from the butt it was twenty-six inches in diameter. It was not durable as timber ; but for planks and boards, such as the native carpenters use, it is preferred to any other of the small knotty woods. It is a fact, he adds, which my experience in the county has taught me, that all teak-timber, above twenty inches in diameter at the butt, has the heart shake from end to end, and consequently, requires much care to convert it to use ; which should be done by a saw-cut into the heart of the wood and then either of the two parts might be used as timber or plank. But teak generally grows straight, and, consequently, for the timber of a large ship its curve crosses the grain of the wood : the shake runs through the timber on the outside at the head and heel, and, in the inside, it follows the curve in the middle, nearly breaking through to the surface. This shake, of four or five inches broad, and an inch or an inch and a half open in the heart of the timber, must be totally destructive to it ; as must have been the case in the Minden seventy-four gun ship.—The next sort of teak on the coast is that which grows in the forest of the Ghats. It is curved, hard and knotty, as the soil is not deep, its bed being rocks. This timber resembles in growth and appearance the English oak ; its weight is very considerably more than that which grows to the large size ; and the texture and durability of this timber is well known to those who are acquainted with the grain of woods.—Teaks will be found to differ in weight from thirty-nine pounds six ounces to fifty-two pounds fifteen ounces the cubic foot, when seasoned ; but the heaviest, when green, that I have found, were only fifty-seven pounds nine ounces the cubic foot. I am told some of the teaks from the Cochin forest weigh as much as sixty pounds the foot, when green. The third sort of teak is procured from Pegu, Rangoon, Ava, and the Burmese territories. For ship building it is very inferior to that of Malabar. It is generally considered, by persons unacquainted with the nature of timber, that "the teak from that country is superior to any other in India," this is acknowledged by competent persons so far only as regards the size of the tree, and the free and clear grain of the wood. There can be no doubt that it is better for purposes of house-building, and the general uses of the native carpenter, from the ease he finds in working it. This timber, as well as that before described, grows on a rich deep soil, and, consequently, its maturity is rapid and its dimensions large ; but the texture of the wood is as different from that of the forests of the Ghauts, as the American and Dantzic are from the English oak. At Rangoon and Pegu this timber is split in the heart shake into two parts, which the natives call shimbins, and this shews the freeness of the grain of the wood. These pieces are priced according to their size ; and this sort of teak is better known to the merchants and captains of the country-trade than any other, on account of its use for the repairs of vessels, or as sea-shore timber. The teak may be said to be the most valuable tree in India. It produces a good oil, which is used with paint as a substitute for Linseed-oil ; and which also makes a good varnish for paint or wood, and is known generally by the name of wood oil. The leaf of this tree is large and round, in shape resembling a cabbage leaf, about ten inches in diameter, but very thin, although its fibres are strong. The blossoms and berries are produced in large bunches : when in bloom, they may be compared to hops ; when in seed, as to size, to a bunch of grapes. The nut is of a dark russet brown, and very hard: when ripe, it falls to the ground and plants itself. A forest patch of teak, when in full bloom, has much the appearance of a field of ripe corn when viewed from a distance, with a few spots of green interspersed; by this appearance the native hill people discover the trees of teak at this season, and cut around their roots to prevent the sap from ascending the next year. The persons who work the forests of teak on the side of the hill are thus able to distinguish at a distance those trees from the others, and cut them down for floating to the depot, which can only be done at the setting in of the monsoon, when the rapids fill the nalas; and then the tremendous torrents dash whatever may be thrown into them from one fall to another, from heights of fifty feet at a fall, until at last it reaches the depot, having been brought down by a circuitous route of one hundred miles, from a height of from 1000 to 2000 feet above the level of the sea. Much might be said on the uses and durability of teak and foreign timber, but it will be desirable to postpone that until its practical uses have been proved. There cannot be a doubt that the climate and temperature of its native atmosphere is the most favourable to its durability. Its value, for the purposes of ship-building, does not consist merely in its durability; a still greater advantage is, that the ship is at all times ready for service, while ships of European wood, constructed with oak and fir, are constantly warping and crazy, and in forty-eight hours after the caulking of the topsides are frequently as leaky as before: the health of the crew suffers, in consequence, at the change of the monsoon, from exposure to the damps of a tropical climate; and also, from this cause, the carpenter's crew are kept fully employed. But the teak ship, when well caulked, remains dry and comfortable to the crew; and is always an efficient ship for service. The many contradictory reports of sailors on the state of ships of war on foreign stations, is to be placed to the want of knowledge of the true state of facts. It is well known in the dockyards that, by a continual caulking of the sides or decks of a ship, the wood is so completely compressed on the seams and edges of the plank by the caulking iron, that the oakum is forced through the seam into the ship, and that that seam can never be again caulked tight. From this cause the oakum in the seam becomes wet and rotten; and the ship's crew are exposed to the injurious effects of inhaling the putrid air through the openings of the ship's timbers. The confined state of a ship under hatches in a tropical climate, is well known to all who have been on board one in the heavy tropical rains and gales of wind when the monsoon sets in, and which last for days and weeks together.—*Edye, Malabar and Canara.* See TECTONA.

(8076) TEAK WOOD OIL. An opaque dull ash coloured oil, under this name, is procurable in most of the large Bazars of India; when allowed to rest for some time, it separates into two layers, an upper or dark coloured clear stratum and a lower and more solid-deposit. Its chief use is for applying to woodwork of all sorts, either alone as a natural varnish, or in combination with certain resins.—*M. E. J. R.*

(8077) TEAL, the common name of a Natatorial Bird belonging to the family *Anatinæ.* This bird is the *Querquedula crecca*, Steph.; the *Anas crecca*, Linn. It is one of the smallest of the *Anatidæ*, and most beautiful of ducks. It is the Sarcelle, Petite Sarcelle, Cercelle, Cercerelle, Alebrande, Garsote, and Halebran, of the French; Cercedula, Cercevolo, Scavolo, Sartella, Anitrella, and Anitra d'Inverno, of the Italians; Spiegel-Entlein and Kriekente of the Germans; Winter Taling of the Netherlanders; Arta and Kræcka of the Swedes; Kestelort-And of the Norwegians; Krik-And of the Danes; Cor Hwyad and Brach Hwyad of the Welsh. This species is one of the most delicate of the ducks. Willughby remarks that, for the taste of its flesh and the wholesome nourishment it affords the body, it "doth deservedly challenge the first place among those of its kind." In the 'Portraits d'Oyseaux' (1557), the following quatrain celebrates its excellence, and alludes to its habits:—

> "Bien peu souvent se plonge la sarcelle
> Entre deux eaux, de lequelle la chair
> Est delicate: aussi couste elle cher
> Autant qu'oyseau qui soit petit comme elle."

Accordingly we see it holding a high place in ancient feasts. We find it among the 'goodly provision' at the banquet given at the enthroning of George Nevell, archbishop of York, in the reign of Edward IV.: 'Mallardes and Teales, 4000. The price in the Northumberland Household Book is—'Teylles, 1*d.*,' mallards being 2*d.* —*Eng. Cyc.*

(8078) TEASEL, FULLER'S THISTLE, OR TEAZLE.

Chardo a carder, FR.
Cardon da Cardare, IT.
Weberdistel, Kratzdistel, GER.
Cardeucha, Cardo peinador, SP.

This plant, which is cultivated in the North and West of England, is of considerable importance to clothiers, who employ the crooked awns of the heads for raising the nap on woollen cloths, &c. (*McCulloch*)—*Faulkner.*

(8079) TECOMA, a genus of plants beloning to the natural order *Bignoniaceæ.* It has a companulate 5-toothed calyx, a short-tubed corolla with a companulate throat, and a 5-lobed bilabiate limb; 4 didynamous stamens with a sterile filament of a fifth; a bilamellate stigma; a sillique-formed 2-celled capsule, having the dissepiments contrary to the valves; the seeds winged, disposed in 2 rows.

The species are erect trees or shrubs or scandent plants, with unequally pinnate or digitate simple leaves with terminal panicles, and yellow or flesh-coloured flowers. They are natives of the Old and New World in tropical and sub-tropical climates. They are all elegant plants, and well worthy of cultivation. Several species of *Tecoma* have reputed- medicinal virtues. *T. speciosa* is said to be a useful diuretic, also a cathartic. *T. impetiginosa* and *T. Ipe* contain large quantities of tanning.—*Eng. Cyc.*

(8080) TECOMA CAPENSIS. An elegant creeping plant with orange colored flowers well adapted for covering a wall or running up a trellis work, grown from seed in common garden soil.—*Riddell.*

(8081) TECOMA JASMINOIDES. This plant is cultivated in the same way as the former. The color of the flowers pink.—*Riddell.*

(8082) TECOMA RADICANS is a climbing glabrous plant with rough rooting branches. It grows against a wall by throwing out roots from its branches in the same manner as ivy. It has large flowers, which are called Trumpet-Flowers. —*Eng. Cyc.*

(8083) TECOMA STANS is a small tree, or ornamental garden shrub. Its roots are reputed diuretic, Hort Garden 6.—*M. E. J. R.*

(8084) TECTONA, a genus of Plants belonging to the natural order *Verbenaceæ.* It is characterised by having a 5-6-toothed calyx, which becomes inflated over the growing pericarp; corolla 1-petalled, 5-6-cleft; stamens 5, but often 6; germ superior, 4-celled; cells 1-seeded, attachment central; drupe obtusely 4-sided, woolly, spongy, dry, hid in the calyx. Nut hard, 4-celled. Seed solitary; embryo erect without perisperm.—*Eng Cyc.*

(8085) TECTONA. *Species.*

Oomy takoo marum, Tam.

Dr. Wight says of this I am as yet uncertain whether to view this as a variety or distinct species of teak. Specimens tested here proved very inferior in strength to the true teak, breaking with a weight of only 300 lbs., while the other sustained above 400.—*Wight.*

(8086) TECTONA GRANDIS.

Teak tree, Eng. | Takoo chettoo, Tel.
Sagwan, Hind. | Take marum, Tam.

The only species is the Teak-Tree, which grows to an immense size, and is remarkable for its very long leaves, which are from 12 to 24 inches long and from 8 to 16 inches broad, and are compared by oriental writers to the ears of the elephant. The best teak-timber for ship-building was supplied to Bombay from the mountains of the Malabar Ghauts, where the tree is found rather in detached clumps, of some extent however, than in extended forests. It is also found on the mountainous parts of the Coromandel coast, along the banks of the Godavery up to Poloonsha. It proceeds far into the interior of India, and may be seen in the mountains of Bundulcund, in the form however of only a moderate-sized shrub. Dr. Roxburgh introduced the Teak into the low grounds of the Circars as early as 1790, and Lord Cornwallis and Colonel Kyd planted it in Bengal about the same time. The Calcutta Botanic Garden contains a number of these trees. From the Saharunpore Botanic Garden, in 30° 9' N. lat. (where, its buds being covered with scales, it is enabled to resist cold, besides its leaves falling and giving it a season of rest), the tree has been spread along the Doab Canal; the whole of the intermediate country is suited to its cultivation, and the East India Company have ordered the Malabar forests to be preserved. The most extensive forests are however those extending along the banks of the Irrawady, especially in Pegu —*Eng. Cyc.* See TEAK.

(8087) TECTONA GRANDIS. *Var.* HUL TEAK. Wynaad about Sultan's Battery, scarce; considered superior to the common Teak.—*McIvor. M. E.*

(8088) TECTONA HAMILTONIA HAMILTON TEAK. This is an inferior species of teak that grows on the banks of the Irrawaddy; and from native descriptions, appears to be found in the province of Yay.—*Mason.*

(8089) TECTONA TERNIFOLIA, of Tenasserim.—*Mason.*

(8090) TEJBAL.

Tejbal, Guz. Hind. Pers.

The seeds and capsules of the *Xanthoxylum hostile*, which are employed by the natives of northern India as a remedy for the tooth-ache, and also for intoxicating fish. They have a warm, spicy, pepper-like pungency, a property which is participated in by the bark, and other parts of the tree.—*Faulkner.*

(8091) TEJPATA. LEAVES of LAURUS or CINNAMOMUM. Malabathrum, the folia Malabathri of the ancients.—*Ben. Phar.*

(8092) TELEKIA, COMPOSITÆ.—This plant bears a yellow flower, and grows in any common garden soil.—*Riddell.*

(8093) TELINI, INDIAN BLISTERING FLY. Meloe or Mylabris Cichorii. The wing coverts are marked with large spots of light brown alternating with deep blue. Another blistering fly is small, steel blue, Cantharis Violacea.—*Ben. Phar.*

(8094) TEMIA (Le Vaillant), a genus of Perching Birds, which, Cuvier observes, M. Vieillot has changed into *Crypsirina*, and Dr. Horsfield into *Phrenotrix*, whilst M. Temminck arranges them under *Glaucopis.* Mr. Swainson thus characterises *Crypsirina*:—Bill shorter than the head, much compressed; the culmen considerably arched, and curved from the base. Nostrils small, basal, concealed by incumbent feathers, which are either soft or setaceous. Wings short, much rounded; the primaries hardly longer than the secondaries. Tail feathers broad and obtuse. Feet moderate, arboreal. The middle toe and claw short, but as long as the tarsus; lateral toes unequal; hind toe and claw shorter than the tarsus. It is a native of India.

(8095) *Crypsirina vagabonda* (*vagabundo*) and *C. Temia* are among the species given as examples. The first of these is the *Pica vagabunda* of Gould ('Century of Birds from the Himalaya mountains'). Dr. Horsfield, who gives *Corvus varians* as the synonym of his *Phrenotrix Temia* (the Chekitut, or Benteot, of the Javanese'), states that although not a rare bird in Java, his *Phrenotrix* is by no means familiar, and never approaches the villages and habitations like many others. ('Zoological Researches in Java.')—*Eng. Cyc.*

(8096) TENTUKIE, the Malayala name of a Ceylon tree which grows to about twelve or eighteen inches in diameter, twelve feet high: it cannot be considered valuable. It is sometimes used by the natives for inferior and common purposes.—*Edye, Ceylon.*

(8097) TEPHRODORNIS (Swainson), a genus of Drongo Shrikes, *Dicrurinæ.* [LANIADÆ] —*Eng. Cyc.*

(8098) TEPHROSIA (from τεφρός, ash-coloured), the name of a genus of Plants belonging to the Papilionaceous division of the order *Leguminosæ.* The genus consists of shrubs or herbs, with usually unequally pinnated leaves, and lanceolate or subulate stipules distinct from the petiole. The flowers are white or purplish, arranged in racemes which are mostly axillary; the calyx is without bracts, 5-toothed, nearly equal; vexillum of corolla large, silky outside, and reflexed in a spreading manner; wings adherent to the keel; stamens separate or united in one or two parcels; legume mostly sessile, linear, compressed, many seeded, with the valves flat; seeds compressed. This genus at present includes 84 species, but it is probable that a more accurate investigation will result in making several genera of the present one. The American and Asiatic species are in some measure distinguished by their properties. In the former a narcotic poison is more frequently secreted; in the latter a colouring matter.—*Eng. Cyc.* Dr. Wight, in Icones gives Tephrosia incana, 371; senticosa, 370; spinosa, 372; and tinctoria, 388.

(8099) TEPHROSIA APOLLINEA. *Syn.* Galega apollinea A native of Egypt. The leaflets are obovate, oblong, emarginate, silky underneath. They yield indigo when fermented, and are often mixed with the Alexandrian senna.—*O' Shaughnessy, page* 292. *T. Apollinea* is shrubby, and covered with a close pubescence; the leaflets are silky beneath, and in 2 or 3 pairs; the legume is 6 or 7-seeded, and rather pubescent. It is a native of Egypt, and yields a blue colouring-matter, which is used in dyeing.—*Eng. Cyc.*

(8100) TEPHROSIA PISCATORIA, th Fisher's Tephrosia, contains the narcotic principl of the genus, and is used in the East Indies to the same purposes as *T. toxicaria* is in the West Indies.—*Eng. Cyc.*

(8101) TEPHROSIA PURPUREA. GALEGA PURPUREA.

Poonkhie, SANS. | Surpunka, BENG.

A native of the sandy coast of Coromandel The root is bitter, and given by the native practitioners in dyspepsia and chronic diarrhœa.—*O'Shaughnessy, page* 292.

(8102) TEPHROSIA TINCTORIA, the Ceylon Indigo, is a shrubby glabrous plant with 5 pairs of leaflets, silky and villous beneath; flowers purple or flesh-coloured, seated on axillary peduncles; straight pendulous legumes. This plant is a native of Ceylon, where it is called Anil. Its tissue yields a blue colouring-matter. which has the same properties as the indigo, and is used in Ceylon for the same purposes. There are other plants used in Ceylon for dyeing also, called Anil.—*Eng. Cyc.*

(8103) TERAI. At the north foot of the Khasia, in the heavily timbered dry Terai, stretching for sixty miles to the Burrampooter, it is almost inevitable death for a European to sleep, any time between the end of April and of November. Many have crossed that tract, but not one without taking fever: Mr H. Inglis was the only survivor of a party of five, and he was ill from the effects for upwards of two years, after having been brought to death's door by the first attack, which came on within three weeks of his arrival at Churra, and by several relapses. Temperature in September 77° to 80°; and in November 75° to 77°.—*Hooker Him. Jour. Vol.* I. *page* 266.

(8104) TEREBELLUM, a genus of *Mollusca* placed by Cuvier among his Pectinibranchiate Gasteropods, between *Ovula* and *Voluta*; by De Blainville among his *Angyostomata*, between *Conus* and *Oliva*; and by Rang between *Mitra* and *Ancillaria.* The fossil *Terebellum convolutum* is the type of Montfort's genus *Seraphs.*

(8105) TEREBELLUM SUBULATUM, a native of the East Indies, may be taken as an example of the recent species, and *T. convolutum* of the fossil forms.—*Eng. Cyc.*

(8106) TEREBINTACEÆ, a natural order of Dicotyledonous Plants constituted by Jussieu, and adopted by De Candolle, Arnott, Don, and other writers on systematic botany. Brown has however divided it into five orders, viz. Anacardiaceæ; Burseraceæ; Connaraceæ; Spondiaceæ; Amyridaceæ.—*Eng. Cyc.*

(8107) TERMINALIA (from 'terminus'), is the name of a genus of Plants belonging to the natural order *Combretaceæ.* The species of this genus consist of trees and shrubs, with alternate leaves, which are usually crowded together at the ends of the branches. The flowers are destitute of petals, and are disposed in spikes, which are racemose and panicled ; in the lower part of the spikes they contain both stamens and pistils, but in the upper part they contain only stamens ; the limb of the calyx is campanulate, 5-cleft, with acute lobes ; the stamens are 10 in number, arranged in two series, and are longer than the calyx ; the ovary contains two ovules ; the style is acute, and the fruit is drupaceous, containing only one seed. All the species are inhabitants of the tropical parts of Asia and America. They are numerous, and many of them are used in medicine and the arts. —*Eng Cyc.* In the celebrated Myrobalans of ancient and eastern pharmacy, an astringency is the prevalent principle, although the fruits of *Terminalia Chebula* are gently laxative also. *T. Catappa* affords edible kernels, like almonds, and are named *badam*. *T. Benzoin* in the Mauritius gives a milky juice, which becomes fragrant as it dries, and is burned as incense in churches. —*O'Shaughnessy, page* 339.

(8108). TERMINALIA. *Species.* PENTAPTERA? Every member of the genus terminalia yields useful timber, and the chebula, and bellerica have been noticed as indigenous in Tenasserim. A still larger timber tree is common in the interior, whose winged fruit indicates its connection with Roxburgh's genus pentaptera.—*Mason.*

(8109) TERMINALIA ALATA, Ainslie. T. TOMENTOSA, Wall. Roxb. *Combretaceæ*, *Icon* 195.

Muddee, TEL.
Maroodum Tree, ENG.
Jungly karinj, HIND.
Maroodum marum, TAM.
Urjoon, HIND.

Arjuna, SANS.
Kumbuk, CING.
Kooroo-marthi mara, CAN.
Junglee karing, DUK.

This tree often grows to a very large size. The wood of it is employed for long beams in house building. In the northern parts of Canara it is used for making boats and canoes.—*Ains. Mat. Med. p.* 209. Fruit glabrous, bark deeply cracked, astringent and febrifuge. As found in the Bazars its colour is reddish brown, taste astringent; in powder and with oil it is used in apthæ. (Roxb. Fl. Ind. ii. 440.)—*O'Shaughnessy, p.* 340.

The Bark.

Marudum Bark, ENG.
Marudum puttay, TAM.

Muddie putta, TEL.
Arjuna, SANS.

The bark as it appears in most of the Indian bazars is of a reddish brown colour, and has a strong but not unpleasant, astringent taste. In the Southern provinces, the powder of it in conjunction with Gingilie oil, is used as a valuable application for the kindatalic, (Apthæ of grown people) and the Akkirum, or Apthæ of infants. —*Ains. Mat. Med. p.* 58. In the Wynaad, Carroo-Marrathoo, Terminalia alata, is used for the same purposes as Ben teak, under which name it is frequently sold : common on the Western Ghauts and in Wynaad : wood not durable. —*McIvor.*

(8110) TERMINALIA ANGUSTIFOLIA. The leaves are linear-lanceolate, very thin at both ends, pubescent beneath ; the petioles are also pubescent, and have two glands at their apex. This tree is a native of the East Indies, and was formerly called *Terminalia Benzoin*, as it yields on tapping a gum-resin very similar to benzoin, and possessing the same properties.—*Eng. Cyc.*

(8111) TERMINALIA BELLERICA. (BELERIC MYROBALAN.) *Combretaceæ*, Ill. 91.

Bulla, DUK.
Beleyluj, ARAB.
Bahira, SANS.
Beheyra, HIND.
Beleyleh, PERS.
Tadi chettoo TEL.

Tam kaia marum or Tonda muram, also Tanikoi or tandee marum Cattoo eloopæ, TAM.

A very large tree; common in Mysore and mountainous parts of India ; has a straight trunk and spreading head ; leaves deciduous about the beginning of the hot season, when the flowers appear ; fruit round, covered with a grey silky down ; common in the Deccan. The flowers have an offensive smell —*Riddell.* Of this tree, the wood is white and soft, and not much used. The kernel of the fruit is eaten by the natives. (Wight No. 11-99, Mysore 27, 18, Tinnevelly 47, Travancore 306, Cleghorn.)—*M. E. J. R.* Drupe oval, somewhat five-angled, size when dry of a gallnut, and dirty brown colour ; size of a nutmeg, and fleshy when fresh, with a grey silky down, very astringent ; kernels eaten, and deemed intoxicating ; bark abounds in gum. Ainslie reckons the fruit as astringent, tonic, and attenuant. Dose one to two drachms. It is much used in the arts as an astringent, and as the basis of several colours.—*O'Shaughnessy, page* 341. It is abundant in the Kotah jungles and the wood is very hard.—*Irvine.* Wood said by Roxburgh to be durable, but not much used. In Malabar it is hollowed out for canoes, which however are said not to be lasting. It is not an uncommon tree in the Walliar Jungles, but is considered of no value there. Perhaps the tree called by the name of *Tanikai Marum*, or *tonda marum*, in Malabar, is the Terminalia Berryi, which also attains a large size, and is more nearly allied to the Curray Murdah, as belonging to the same section of the genus.—*Wight.* It furnishes a large and valuable timber. The wood is employed for making Catamarans, and is also hollowed out into grain measures, &c.— *Ains. Mat. Med. p.* 206. Myrobalans are the dried fruits of trees very common in many districts of India ; viz : several species of *Terminalia.* They are much valued as a tanning material. The myrobalans are about an inch in length, about the size and shape of a Spanish olive, with an ash yellow coloured pericarp, generally strongly marked with longitudinal wrinkles. They have become a very important item in commerce, but their introduction to general use can only date back about ten years. The imports into England, according to Mr. Poole, now amount to about 1200 tons annually: from Madras, 1853-54, the exports were 4,145 cwt. value 8,447 Rs.—*M. E J. R.*

(8112) TERMINALIA BERRYI. COMBRETACEÆ.

Vellai maroodoo, TAM.
Vellay murdah wood, ENG.
Vallay murdah marum, TAM.

This, judging from some introduced plants growing in Coimbatore, is a very large tree. The bark is quite smooth, and nearly as green as the leaves. The wood is white, described as of ordinary quality, used on the coast for canoes, and for making the broad wooden platters in use among fishermen and ship lascars.—*Wight.* This tree attains a large size, especially at the foot of the W. Ghauts, where it is used for canoes, &c. (Wight). Wight No. 111, Travancore 225, 320, Hort. Garden 64.—*M. E. J. R.*

(8113) TERMINALIA CATAPPA, Lin. Icon. 172. *Combretaceæ.*

Country almond tree, ENG.
Nattoo vadom cottay, also Nattoo vadom marum, TAM.
Budamie, HIND
Vadom vettello, TEL.
Catappa, MALAY.
Ingudi SANS.
Badam, BENG.

A beautiful large tree, found in gardens, &c, the kernels are eaten and are palatable, the wood is also useful. (Wight No. 54, Hort. Garden 63.)—*M. E. J. R.* *T. Catappa* has obovate leaves, tapering to the base, pubescent beneath, and glands on the under sides of the midrib. It is originally a native of the East Indies, but has now become naturalised in the West India Islands. Some botanists have described the West India species as distinct from the Asiatic, but there is no good distinctive character. The drupaceous fruit of this tree is about 3 inches long, and contains a large seed, which is eaten, and also yields an oil, in the same manner as the almond. This tree, on account of its thick foliage, is much planted in the tropics for the purpose of forming avenues near houses. The bark and leaves yield a black pigment. Indian ink is manufactured from the juice of this tree.—*Eng. Cyc.* This is probably a Malayan species, but is cultivated in India, and is a valuable timber tree. Drupe three inches long, egg-shaped, grooved; kernel resembles the almond or filbert in taste and composition; yields an excellent fixed oil, and is good nourishing food. The bark and leaves are very astringent, and yield a black paint.—*O'Shaughnessy, page* 341. In the Kotah gardens this is a very handsome garden tree.—*Genl. Med. Top. p.* 193. *Terminalia Catappa* grows commonly in all parts of the Deccan. It is raised easily from seed, and in a good light soil, well watered, will in two years be ten or more feet in height, and give blossom. It is rather a handsome tree, and, from its large leaf (which turns red previous to its falling off,) has a very striking appearance. The fruit is of the size of a coarse plum, and the kernel, contained within the shell, resembles the English Filbert in flavour. It is produced at table with the desert.—*Riddell.* This tree is procurable in Malayalum. The wood, judging from an outside specimen, has a good deal the appearance of beech, showing much silver grain in some sections, but it is more porous and not so close grained.—*Wight.* It attains a large size in Malabar where the wood is much esteemed, it is called by the English, the Almond tree, from the oval shape of the fruit, but the kernel is cylindrical.—*Wight.* It is reckoned a valuable wood by the natives, who generally employ it in making Pikotics.—*Ains. Mat. Med. p.* 206.

The fruit.

Nat Vadomeottay, TAM.
Badam-i-Hindee, DUK.
Vadomvittiloo. TEL.
Hinghoodie, SANS.

This has got the appellation of country Almond, in India, from its resemblance to the Persian fruit of that name in taste and appearance, though it has, perhaps, more the flavor of an English filbert. It is the produce of a very large and certainly one of the most beautiful trees in the world. The tree is the Adoa marum of the Hortus Malabaricus, the Malayas call it Catappa. The kernels of this large and most beautiful tree are recommended by the Vytheans as a light and nourishing diet for weak people.—*Ains. Mat. Med. p.* 92 and 228.

(8114) TERMINALIA CHEBULA. (CHEBULIC MYROBALAN.) Myrobalana Chebula, Gærtn. ii. t. 97.

Pillamarrda, CAN.
Heerda, also Huldah, DUK.
Pilla murda or Kadookoy, TAM.
Alali mara, CAN.
Araloo, CING.
Haritaka, SANS.
Heleiji kabule, ARAB.
Hehleh Kelan, PERS.
Pilla murdah wood, ENG.
Karaka Chettoo, TEL.
Har Hara, Umbed'her, HIND.
Kayoobin, BURM.

This large timber is plentiful throughout the Pegu Teak Forests, wood, red-colored, strong and adapted for house-building.—*McClelland.* In Tenasserim the fruit of the Terminalia Chebula mixed with an iron clay is in common use to form a black dye, which is said to be very good. All the Burmese native ink is made from this fruit, but although black when used, in the course of a dozen years it sometimes fades so that the writing is scarcely legible. The tree is found throughout the Tenasserim Provinces, but is not very abundant.—*Mason.*

It flowers in May. The moochies use the fruit to form a black dye.—*Riddell.* The tender leaves of *Terminalia chebula* are punctured by an insect, and its eggs deposited therein; hollow galls, Huldee Kay, *Tel.* Kadukay, *Tam.* are subsequently formed, these are powerfully astringent, and make as good ink as oak galls. They also yield to Chintz painters and the Carpet weavers at Ellore the most durable yellow. Mr. Rohdes states that it forms perfect leather, but is too expensive for ordinary tanning purposes.—*M. E. J. R.* The trivial name *Chebula*, is from *Cabul*, where it is very abundant. It is a large tree, native of the forests of India from Cape Comorin to the mountains of Oude &c. The tender leaves are punctured by an insect and its eggs deposited therein becomes enlarged into hollow galls, they are a powerful astringent and make as good ink as oak galls, they also yield the chintz painters, and Carpet weavers their best and most durable yellow. They are called by the Tamuls "kadukay" and by the Telingas aldicoya.—*Rohdes' M. S. S.* *Terminalia Chebula* is distinguished by possessing opposite leaves which are pubescent beneath. The fruit of this species is more astringent than the others and is used for the purposes of dyeing. A durable ink is made by mixing the salts of iron with an infusion of the outer rind of the fruit. Both this species and others are subject to the attacks of insects producing gall-nuts. These galls possess the astringent principle in abundance, and are also used for dyeing. They are called Cadacay by the Tamuls.—*Eng. Cyc.* This most gigantic tree, furnishes planks 3 feet broad. It has a dark coloured, heavy and hard wood, but very cross grained and difficult to work. It sustained about 400 lbs.—*Wight.* It is common in the Kotah jungles (*Irvine, p.*193.): also in the forests of Bengal and common in the forests of Western India.

Trunk rarely straight, short, bark ash-coloured, branches numerous and spreading. Fruit very astringent; in its dry state about the size of an olive. With catechu it is applied with great advantage in apthous ulcerations. The *Zengi Har* of Bengal, Singi, *Tamul.* Kurkadaga *Sans.* (Black Myrobalan), is described by Ainslie as the unripe dried fruit, and as a brisk purge. It is deep black, oblong, pointed and slender. It is called *Ahleelaj-asood* by the Arabs, *Helileh-seeah* by the Persians, who give it as a cathartic, in doses of from 1 to 2 drachms with a little honey.—*O'Shaughnessy, page* 320.

(8115) TERMINALIA CITRINA. CITRON MYROBALAN.

Liba, SANS. | Haria, Harra, HIND.

Common in the Kotah jungles. All these Myrobalans are largely collected, and used by the natives in dyeing and in medicine.—*Gen. Med. Toh. p.* 103. Drupe oblong, lanceolate, about two inches long, two in circumference, obscurely five-grooved, dull orange-yellow, smooth; nut oblong, deeply five-grooved, one-celled. Fruit a gentle purgative. It is often made into a pickle.—*O'Shaughnessy, p.* 340.

(8116) TERMINALIA GLABRA. COMBRETACEÆ,

Karai Maroodoo marum, TAM. | Curry murdah wood, ENG.

Icon. 196, nearly represents this species. Dr. Wight speaks highly of this wood, and states that large beams are readily procurable at Coimbatore for house building purposes. It is very hard, heavy and durable under water. (Wight No 16, Travancore 78, 101, 383, Mysore 30, Paulghaut 21, Cleghorn.)—*M. E. J. R.* Inch bars bear from 430 to 450 lbs.—*Wight.*

(8117) TERMINALIA MOLUCCANA. (Sylhet, Moluccas.) Drupe round, ovate, size of a large nutmeg, used as T. bellerica, for which it is substituted.—*O'Shaughnessy, page* 341.

(8118) TERMINALIA NITIDA.

Yella, DUK.

A large tree with oblong fruit, from which an intoxicating liquor is made.—*Riddell.*

(8119) TERMINALIA RUBRICA.

Vibbituka, SANS.
Buhira, BENG.
Beleyleh, ARAB.
Tandra marani, TAM.
Tani, RHEED.
Toondee, TEL.

A native of the mountainous parts of the Circars, growing to be one of the largest trees, with an erect trunk, and very spreading head. The kernel of the fruit is eaten by natives, but is reckoned intoxicating when eaten in any quantity. Wood white, rather soft, durable and seldom used. From wounds in the bark large quantities of insipid gum issues. The flowers have a strong offensive smell.—*Roxb. Rohdes, M. S. S.*

(8120) TERMINALIA VERNIX. One of the trees which affords the celebrated Chinese black lacquer.—*O'Shaughnessy, p.* 341. *Terminalia vernix*; is a native of China, and the Moluccas, and abounds in a resinous juice, which is collected by the inhabitants, and used in the natural state as a varnish. It is also used for the same purpose in China.—*Eng. Cyc.*

(8121) TERMINALIA VIOLATA.

Panjah, BURM.

Both this and *Terminalia belerica*, "Lai-bwai" *Burm.* are very plentiful throughout the Pegu, Toungboo, and Tharawaddy Forests; the former less plentiful. Both are large timber and would answer for all purposes of house-building. Wood, white colored, adapted to every purpose of house building.—*McClelland.*

(8122) TERMITINÆ, a section of Neuropterous Insects, in which Latreille includes the genera *Mantispa*, *Raphidia*, *Termes*, and *Psocus*. These genera however are usually regarded as constituting three distinct families.

(8123) TERMITIDÆ. This family is distinguished by the following characters:—Wings with few transverse nervures, folding horizontally; tarsi 4-joined; antennæ short and moniliform; body depressed.

(8124) TERMES, has the head large and rounded, and, besides the ordinary compound eyes, it has three ocelli, or simple eyes, situated on the upper surface; the antennæ are as long as the head and thorax, inserted in front of the eyes, and composed of about 18 joints. The abdomen is terminated by two small jointed appendages.

(8125) TERMITES, OR WHITE ANTS.

Anai, Malay. | Chelloo, Tam.
Dewuk, Hind. | Cheduloo, Tel.

White ants, as they are often called (though they have little affinity with the true Ants), are chiefly confined to the tropics; some few species however extend into the temperate regions. Like the Bees, Wasps, and Ants, which live in society, the Termites are composed of three kinds of individuals—males, females, and what are termed neuters or workers. Their ravages in the warmer parts of the globe are well known. They unite in societies composed each of an immense number of individuals, living in the ground and in trees, and often attacking the wood-work of houses, in which they form innumerable galleries, all of which lead to a central point. In forming these galleries they avoid piercing the surface of the wood-work, and hence it appears sound when the slightest touch is sometimes sufficient to cause it to fall to pieces. The Termites sometimes erect their domiciles on the ground, in the form of pyramids or cones, sometimes with a roof, and these nests are often very numerous, and resemble the huts of savages. The larvæ nearly resemble the perfect insect, excepting that they possess no wings. The pupæ have rudimentary wings. The neuters differ from the males and females in possessing no wings, in having the body stouter, the head much longer, and provided with long jaws crossing at the extremity. They are said to defend the nests, and, stationing themselves near the outer surface, they are the first to make their appearance when their habitation is disturbed. They will attack the party molesting them, and bite with considerable strength. The negroes and Hottentots in Africa and people of India, consider these insects a great delicacy. They are destroyed with quick-lime, or more readily with arsenic, which is thrown into their habitations.—*Eng. Cyc.*

(8126) TERNSTROMIACEÆ, *Theads*, a natural order of Polypetalous Exogenous Plants. It consists of trees or shrubs with alternate coriaceous leaves, without stipules, mostly undivided, and sometimes with pellucid dots. The flowers are generally white in colour, sometimes pink or red, and are arranged in axiliary or terminal peduncles, articulated at the base. The calyx is composed of 5 or 7 sepals, imbricated in æstivation, the innermost the largest; petals 5, 6, or 9, often combined at the base; stamens indefinite, with monadelphous or polyadelphous filaments, and versatile or adnate anthers; ovary superior; capsule 2-7-celled; seeds few, attached to a central axis, with little or no albumen, and a straight embryo, the cotyledons of which are very large, and often filled with oil. This order includes the *Theaceæ* of Mirbel and the *Camellieæ* of De Candolle. Their closest affinity is with the order *Guttiferæ*, from which they differ in their alternate leaves; in the parts of their flowers being 5 and its multiples; in the calyx being distinct from the corolla; in their twisted æstivation, and in their thin inadherent cotyledons. They have also relations with Hypericaceæ and Marcgraaviaceæ. The plants of this order are principally inhabitants of Asia and America and one species of Africa.—*Eng. Cyc.*

(8127) TERU-KUNDLE, the Tamil name of a Ceylon tree which grows to about two feet in diameter, and twelve feet in height. It is used in country vessels, and produces a fruit which is eaten by the natives.—*Edye, Ceylon.*

(8128) TETRAGONIACEÆ, *Aizoons*, a natural order of Exogenous Plants. It includes the Genera *Tetragonia*, *Aizoon*, *Sesuvium*, and *Miltus*, which are generally placed in the order *Ficoideæ*, or *Mesembryaceæ*. The reason given by Dr. Lindley for this separation is the want of petals in these genera, as he considers that the tendency to produce petals in the *Mesembryaceæ* is of too powerful a nature to admit exception. The relation of these apetalous *Ficoideæ* to *Chenopodiaceæ* is so strong, that Dr. Lindley says "there is no character to distinguish them except their ovary being formed of several carpels."—*Eng. Cyc.*

(8129) TETRAGONIA EXPANSA is a native of New Zealand and Japan, and is used by the natives of those countries as a remedy in those forms of cutaneous disease called scorbutic. The *Aizoon Canariense* and *A. Hispanicum* grow on the sea-coasts of the Canary Isles and Spain, and are amongst the plants which yield soda after burning.—*Eng. Cyc.*

(8130) TETRANTHERA, a genus of plants belonging to the natural order *Lauraceæ*. The flowers are diœcious, some hermaphrodite, involucrated. The calyx 6-parted, the segments nearly equal or wanting. The fertile stamens generally about 9, in the petaloid flower than 12 to 21. The leaves are variable, with pinnate veins.—*Eng Cyc.*

(8131) TETRANTHERA MONOPETALA.

Junglee raee am Hind. | Nara mamidee Tel.

(8182) TETRANTHERA ROXBURGHII, Ness. *Syn.* Sebifera Glutinosa, Loureiro. Tetranthera apetala, Roxb. Corom. Pl t. 147. and Fl. Ind. iii. p. 819. Litsea sebifera, *Pers.*

Mueda ka jhar, Hind.

Mountains of India. The wood is the *mueda lukree* of Hindostanee druggists, and a favourite application to bruises and wounds. It is somewhat fragrant, and slightly balsamic and sweet. —*O'Shaughnessy, p.* 548. *Tetranthera Roxburghii* is a variable plant, a native of the mountains of India and China. The fruit is globose, black and about the size of a pea, yielding a kind f greasy exudation from which the Chinese manufacture candles of a bad quality, and which erves as a basis for salves. This fixed oil is supposed to constitute the principal part of the fruit of *Persea gratissima*, so much esteemed in the West Indies under the name of Avocado Pear.—*Eng. Cyc.* Wight gives in Icones Tetranthera, glabrata, 1838; ligustrina, 1835; monopetala, 1833; Panamanja, 1836; tomentosa, 1834; Wightiana, 1833.

(8133) TETRANTHERA TOMENTOSA. LAURACEÆ, Icon. 1834.

Mussay payattie, TAM.

This is a considerable sized tree, but not described by Roxburgh, though he is the authority for the name, hence, says Wight, I am unable to learn any thing of its properties from his work.—*Wight.*

(8134) TETRAO-PERDIX NIVICOLA, Dr. Hooker says that when he descended, he breakfasted on this, the Himalayan grouse, a small gregarious bird which inhabits the loftiest stony mountains, and utters a short cry of "Quiok, quiok." In character and appearance it is intermediate between grouse and partridge, and is good eating, though tough.—*Hooker. Him. Jour. Vol.* II. *p.* 113.

(8135) TETRAONIDÆ, a family of Rasorial Birds, to which the common Grouse belongs. Mr. Swainson thus defines the "*Tetraonidæ*, Partridges and Grouse:—Bill and tail very short; hallux elevated;" and he comprises under the family the following genera and sub-genera:—

Cryptonyx, Temm.; *Odontophorus*, Vieill.; *Ortygis*, Ill.; *Tetrao*, with the sub-genera, *Tetrao*, Linn., *Lagopus*, Willughby, *Lyrurus*, Sw., *Pterocles*, Temm., and *Centrocercus*, Sw., *Perdix*, of Briss., with the sub-genera *Perdix*, *Chætopus*, Sw., *Coturnix*, Briss., *Ptilopachus*, Sw., and *Ortix*, Stedh.; *Crypturus*, Ill., with the sub-genera *Crypturus* and *Nothurus*, Wagl.

Mr. G. R. Gray, in his 'List of the Genera of Birds,' arranges the *Tetraonidæ* between the *Phasianidæ* and the *Chionididæ*, with the following sub-families and genera:—

1. *Perdicinæ.*

Genera :—*Rhizothera*, G. R. Gray; *Ptilopachus*, Sw.; *Ithaginis*, Wagl.; *Lerwa*, Hodgs.; *Pternistes*, Wagl.; *Francolinus*, Briss.; *Chacura*, Hodgs.; *Perdix*, Antiq.; *Arborophila*, Hodgs.; *Coturnix*, Antiq.; *Rollulus*, Bonn.; *Odontophorus*, Vieill.; *Ortyx*, Steph.; *Lophortyx*, Bonap.; *Callipepla*, Wagl.

2. *Tetraoninæ.*

Genera :—*Tetrao*, Linn.; *Lyrurus*, Sw.; *Bonasa*, Briss (*Bonasia*, Bonap.); *Centrocercus*, Sw.; *Lagopus*, Briss.

3. *Pteroclinæ.*

Genera :—*Pterocles*, Temm.; *Syrrhaptrs*, Ill.

(8136) *Pterocles Setarius* the Pin-Tailed Sand-Grouse, Ganga Cata, is an example of the Grouse of Asia. This bird is very numerous on the arid plains of Persia. Not very numerous in France, on the sterile Landes near the Pyrenees, and along the coast of the Mediterranean: less common in Provence and Dauphine, where they occasionally arrive; more common in Spain, Sicily, Naples, and throughout the Levant. Temminck, who gives these localities, states, in the fourth part of his 'Manual,' second edition, that it is common in Provence, in the uncultivated plains of Crau, and says that it avoids cultured tracts, and only inhabits the sterile Landes of the south; but he adds that it is abundant in the Pyrenees, and that it is to be found all the year round in the markets of Madrid. Mr. Gould states that the species is found in the north of Africa. It feeds on seeds, insects, and the young shoots of plants.—*Eng. Cyc.*

(8137) *Cryptonyx*, is a genus which has been variously placed, and by some amongst *Tetraonidæ*. It has the following characters:—Bill strong, stout, compressed, convex above, curved towards the point; nostrils longitudinal, placed in the middle of the bill, and covered by a naked membrane; orbits and lore naked; hind toe without any nail, not touching the ground. Wings short; third, fourth, and fifth quills longest.

(8138) *Cryptonyx cristatus* (*C. coronatus*, Temm.), is the Rouloul de Malacca of Sonnerat. According to Mr. T. C. Eyton, the Malay native name is Bestun ('Catalogue of a Collection of Birds from Malaya,' &c.,) in 'Zool. Proc.,' 1839.

These beautiful birds haunt the great forests of Malaya, Sumatra, and Java. Wild and shy, they avoid the face of man, and are kept in captivity with great difficulty.—*Eng. Cyc.*

(8139) TETRODON, a genus of Fishes of the order *Plectognathi*. These fishes, instead of having distinct teeth as usual in the class, have the jaws provided with a substance resembling ivory, formed somewhat like the beak of a bird, and fitted for crushing crustaceous animals and *Fuci*, upon which they live. Both the Tetrodons and Diodons (*Diodon*, Linn), a very closely allied genus, have the power of inflating the body with wind, or rather a membrane, which extends along the under side of the abdomen, which causes them to float on the surface of the water, without the power, it is said, of directing their course; the membrane, when inflated, gives to the fish an almost spherical form and is usually defended by spines and prickles. The pectoral fins are rather small; and besides these and the tail fin, they have one dorsal and a ventral fin. The Diodons have but one large tooth above and below, and are usually protected by large strong spines. The Tetrodons are distinguished by the possession of four large teeth, the jaws being each divided by a central suture. These fishes are confined to the seas of warm climates: some of them are called Globe-Fishes.—*Eng. Cyc.*

(8140) TEUCRIUM (from Teucer), a genus of plants belonging to the natural order *Lamiaceæ*, or *Labiatæ*.

(8141) TEUCRIUM SCORODONIA, Wood Germander, or Sage, has cordate downy petiolate-crenate leaves; the flowers are of a pale-yellow colour, with violaceous stamens, and are arranged in lateral and terminal 1-sided racemose; the stem is erect, hispid, pubescent, or nearly glabrous, It is a native of Europe in woody hilly situations, where the soil is dry and stony. It is not an uncommon plant in Great Britain. The smell and tasste of this plant resemble very much the hop. In Jersey, where it is called Ambroise, the inhabitants use it as a substitute for hops in their beer; and by some persons the bitter given by the Germander is preferred to that of the hop.

(8142) TEUCRIUM SCORDIUM. It is a native of Europe and the temperate parts of Asia in boggy wet places.

(8143) TEUCRIUM CHAMÆDRYS, Wall, or Common Germander, has ovate incisoserrate leaves, tapering into a footstalk; the flowers are reddish-purple, and arranged in axillary whorls of three flowers; the stem is ascending, and most frequently villous. It is a native of Europe and some parts of Asia, on walls and rocks and dry places. It is only rarely found in Great Britain. —*Eng. Cyc.* This is an ingredient in the celebrated Theriaca andromachi, or *treaq farooq.*—*O'Shaughnessy, p.* 488.

(8144) TEXTILE ARTS. The East has, from the earliest times of which we have any record, been famous for its textile fabrics; and India, notwithstanding the great mechanical inventions of the western world is still able to produce her "webs of woven air," which a Manufacturer of the last century attempted to depreciate, by calling them "the shadow of a commodity," at the same time that his townsmen were doing all they could to imitate the reality, and which they have not yet been able to excel.

Cotton Manufacture.—Though the invention and completion of a loom for weaving would indicate a high degree of ingenuity as well as a considerable advance in some other arts, the Hindoos were acquainted with it at a very early period, for in the hymns of the Rig Veda, composed at least 1200 years B. C., "weavers' threads" are alluded to; and in the Institutes of Manu it is directed,—"Let a weaver who has received ten bales of cotton-thread give them back, increased to eleven by the rice-water and the like used in weaving." That cotton was employed at very early periods is also evident from the Indian name of cotton, *Karpas*, occurring in the Book of Esther, ch. i. v. 6, in the account of the hangings in the court of the Persian palace at Shushan, on the occasion of the great feast given by Ahasuerus, were "white, green, and blue hangings." The word corresponding to *green* is *Karpas* in the Hebrew. It seems to mean cotton-cloth made into curtains which were striped white and blue. Such may be seen throughout India in the present day, in the form of what are called *purdahs*. Vide "Essay on Antiquity of Hindoo Medicine," p. 145. The mode in which these are used, and the employment of the same colours in stripes, is still shown in *sutrunjees*, or cotton carpets. That the Hindoos were in the habit of spinning threads of different materials appears from another part of the Institutes of the same lawgiver, where it is directed that the sacrificial threads of a Brahmin must be made of cotton, that of a shatriya (second caste,) of *sunn* (*Crotalaria juncea*) and that of a Vaisya, of woollen thread. The natives of India prepare fabrics not only of cotton, but also of hemp, and of jute, and other substitutes for flax; also of a variety of silks, and of the wool of the sheep, goat, and camel, as well as mixed fabrics of different kinds. But it is for the delicacy of the muslins, especially of those woven at Dacca, that India has so long been famous. It is pleasing to find that these manufactures still continue pre-eminent for fineness combined with softness. From a careful examination of the cottons grown in different parts of India as well as of those of other parts of the world we find that it is not owing to any excellence in the raw material that the superiority in the manufacture is due, for spinners, here, say that the Indian cotton is unfit for their purposes, being not only short but coarse in staple. It is owing therefore, to the infinite care bestowed by the native spinners and weavers on every part of their work, that the beauty of the fabric is due aided, as they are, by that matchless delicacy of touch for which the Hindoos have long been famous. But this is no small advantage, for according to one of their authors, the first, the best, and most perfect of instruments is the human hand." Experiments were made for a series of years, at the expense of the Indian Government, to grow American cotton in the Dacca district, but without success, owing, it was thought by the American planter in charge, to excess of moisture, and to the depredations of insects.—*Royle.* The Hindoo weaver is often described as hanging his loom to a tree, and sitting with his feet in the ground. If he did so, his productions would appear more wonderful than they are, as being still more the result of means unsuited to the end. But a late resident of Dacca has given a minute account of the cotton manufacture of that district, and thence we learn positively, what might as certainly have been inferred, that great care is bestowed on every part of the process. The spinning-wheel is usually consiered to be an improvement upon the distaff and pindle as our machinery is upon the inexpen- ive spinning-wheel. In facilitating work and iminishing expense, the spinning-wheel was, no oubt, a great improvement, and is still em- loyed throughout India for the ordinary and oarser fabrics. But the spindle still holds its lace in the hands of the Hindoo woman, when mployed in spinning thread for the fine nd delicate muslins to which the names of Dew of Night," "Running Water," &c., are pplied by the natives, and which, no doubt, ormed the *Tela ventosa* of the ancients; and hose called *Gangitika* in the time of Arrian were robably produced in the same locality. Mr ames Taylor, late of the medical service of Bengal, in a report which was sent by the Court f Directors to India, gave much interesting information respecting the cotton manufacture of Dac- a: and to the Exhibition of 1851, he sent a series f views of the different parts of the process, to- gether with the instruments used in spinning, as vell as some specimens of their fine thread. He hows that the Hindoo woman first cards her cotton with the jaw-bone of the *boalee* fish, which s a species of Silurus; she then separates the eeds by means of a small iron roller worked backwards and forwards upon a flat board. An equally small bow is used for bringing it to the tate of a downy fleece, which is made up into mall rolls to be held in the hand during the process of spinning. The apparatus required for this consists of a delicate iron spindle, having a small ball of clay attached to it, in order to give it sufficient weight in turning, and imbedded in a ittle clay there is a piece of hard shell, on which he spindle turns with the least degree of friction. Besides these, a moist air and a temperature of 0° is found best suited to this fine spinning, and t is therefore practised early in the mornings and n the evenings, sometimes over a shallow vessel of vater, the evaporation from which imparting the necessary degree of moisture. The spinners of yarn for the Chundeyree muslins in the dry climate of North-West India are described as vorking in underground work-shops, on account of the greater uniformity in the moisture of the atmosphere. The Indian spinning-wheel is looked upon with contempt by those who look to the polish rather than to the fitness of a tool. Professor Cowper, than whom none is a better judge, observing that the wood-work of some of these spinning-wheels was richly carved, nferred that the strings with which the circum- erence was formed might have some use, and not have been adopted from poverty or from idleness. In making working models of these instruments, he has found that in no other way could he produce such satisfactory results as by closely imitating the models before him, the strings giving both tension and elasticity to the instrument. The spindles, moreover, being slightly bent or the hand held obliquely, the yarn at every turn of the spindle slips off the end and becomes twisted As the different processes are fully described in the work alluded to, I need not, says Dr. Royle, dwell further on this part of the subject, except to mention that the common dimensions of a piece of Dacca muslin are twenty yards in length by one in breadth. There are more threads in the warp than in the woof, the latter being to the former in a piece of muslin weighing twenty tolas or siceas, in the proportion of 9 to 11; one end of the warp is generally fringed, sometimes both. The value of a piece of plain muslin is estimated by its length and the number of threads in the warp, compared with its weight. The greater the length and number of threads and the less the weight of the piece, the higher is its price. It is seldom, however, that a web is formed entirely of the finest thread which it is possible to spin. The local committee of Dacca having given notice that they would award prizes for the best piece of muslin which could be woven in time for the Exhibition, the prize of 25 rupees was awarded to Hubeeb Oolla, weaver of Golkonda, near Dacca. The piece is ten yards long and one wide, weighs only 3 oz. 2 dwts. and may be passed through a very small ring. Though the cotton manufactures of India have so greatly fallen off, from the cheapness of English manufactured goods, it is gratifying, as well as unexpected, to learn from Mr. Taylor, that, as the finest muslins formed but a small portion of the goods formerly exported to England, the decay of the Dacca trade has had comparatively little influence on this manufacture, as these delicate manufactures still maintain their celebrity in the country, and are still considered worthy of being included among the most acceptable gifts that can be offered to her native princes; and he believes that the muslin made at present is superior to the manufacture of 1790, and fully equal to that of the reign of Aurungzebe. He also informs us that a College for the education of the natives, stands on the site of the former English factory. Fine muslins were sent to the Exhibition of 1851, not only from Dacca, but also from Kishengurh in Bengal; likewise from as far south as Collar, in the Rajah of Travancore's dominions, as well as from Chundeyree in the Gwalior territories. Specimens of almost every variety of the cotton manufacture such as the coarse garrhas and guzzees for packing, clothing, and for covering corpses, with dosootees, &c. for tents, canvas for sails, towels, and table-cloths, and every variety of calico, were sent from the islands of the Indian Ocean, from Nepal and Assam, as well as from all along the valley of the Ganges, from Bengal up to the Jullundur Doab, in the Sikh territories; also from Cutch, Ahmedabad, Surat, and Dharwar, on the western side of India; and from the central territories of the Nizam, and of the Rajah of Nagpore. The finest pieces of calico, and Punjum longcloth, were sent from Juggiapettah, in the Northern Circars, which was formerly the great seat of this manufacture. It is curious that some of these places, noted even for their manufactures, did not grow their own cotton. Dacca, no doubt, grew most of what it required for its muslins, because the thread did not swell in bleaching, but it also imported cotton formerly from Surat, as well as from Central India. Azimgurh imports its cotton chiefly from the same source to which the Northern Circars was also formerly indebted, while Chundeyree imports its cotton from the distant valley of Nimur. Among the fabrics there were a great variety, which proves that the natives are acquainted with every kind of weaving, from guzzees and gauzes, to striped, chequered, and flowered muslins. The last are interesting as specimens of an art which has been long known in the East, and the mode of making which has often puzzled weavers in this country. In manufacturing figured (*jamdanee*) fabrics, Mr. Taylor informs us, they place the pattern, drawn upon paper, below the warp, and range along the track of the woof a number of cut threads, equal to the flowers, or parts of the design intended to be made ; and then with two small fine pointed bamboo sticks, they draw each of these threads between as many threads of the warp as may be equal to the width of the figure which is to be formed. When all the threads have been brought between the warp, they are drawn close by a stroke of the ley. The shuttle is then passed by one of the weavers, through the shed, and the weft having been driven home, it is returned by the other weaver." Most of these flowered muslins are uniform in colour but some are in two colours, and chiefly woven in Bengal. Specimens of double weaving in cotton, and showing considerable skill, with a pleasing arrangement of pattern and colours, were sent from Khyrpore, in Sindh. These are also woven in Ganjam. Flax, hemp, and substitutes for them are all well known and extensively cultivated in every part of India ; but flax is so solely on account of its seeds, which yield oil and oil cake, though some very good flax has been produced in some parts of Bengal ; and the hemp, on account of the intoxicating principles secreted in its leaves and green parts, and which in different forms is known under the name of *Bhang*, *husheesh*, *churus*. The fibre of the plant, as grown in the plains is too dry and brittle to be useful either for rope making or for textile fabrics, though in the Himalayas some excellent ropes and canvas are made, and the culture might be greatly extended if there was demand for the produce. Species of crotalaria, of hibiscus, of corchorus and many other genera, yield fibres which a used for rope-making ; but that of the species corchorus, commonly called *jute*, for makin *gunny* bags, used for packing, which are even ex ported to America for packing their cotton. I the Peninsula these bags are made of *Crotalari juncea*, or *goni* plant. The Rhea fibre, which closely allied to, if not identical with, the Chi grass, is used for making fishing-lines and som kinds of fabric, but its employment may b greatly extended So also the plantain, th pine-apple, and the sanseviera fibre, of all which some fabrics have been made and exhibited, but in too small quantities to attract muc attention, though some will probably becom important articles of commerce.—*Royle, Arts & of India, page* 487 *to* 494.

(8145) THALICTRUM (from the Gree *θάλικτρον*), a genus of Plants belonging to the natural order *Ranunculaceæ*. It consists of herbs whic have usually a fetid smell like rue, and hence ar called Meadow Rues. The species have perennial roots with annual stems. The flowers ar corymbose, panicled, and somewhat racemose, c a green, white, or yellow colour ; they have n involucre and no petals ; the calyx is compose of 4 or 5 petal-like sepals ; carpels 4-15 in number. Upwards of 50 species are enumerated which are mostly natives of the temperate an colder parts of the world.—*Eng. Cyc.*

(8146) THALICTRUM FOLIOLOSUM (*Vern.* Peli juree ; Shuprak.) This plant i found at Mussooree, and generally on the Himalayas. Specimens of the roots were sent by Dr Falconer of Seharunpore. Another species o Thalictrum (flavum) is common in France, wher it is termed " the poor man's rhubarb", as substitute for which medicine it is generally employed. The Indian species is easily procurabl from the hills, though not known in the bazar of the lower provinces. The root deserves extensive trial, and promises to succeed well as febrifuge of some power, and a tonic aperient o peculiar value.—*O' Shaughnessy, page* 161.

(8147) THALLOGENS, a class of Plant proposed by Lindley to include those Flowerles Plants which are distinguished by the absence of a axial stem. It includes all the *Cryptogamia*, wit the exception of Ferns and Mosses. [ACROGENS.] —*Eng. Cyc.*

(8148) THANICOY. *Tam.* TERMINALIA BELLERICA.

(8149) THANY MARUM, a tree common about Nelambore and in Coorg ; wood much used but not durable, being very liable to be attacked by insects.—*McIvor. M. E. J. R.*

(8150) THATCH. In the Peninsula of India the ordinary thatch in use with the people, is made of Palmyra leaves : This is the best thatch for houses and the most durable. Next to it in Madras, ranks in value a grass which grows on the banks of rivulets, in the low ountry, and is called "*Koury*," *Cyperus* *extilis*. The leaf of the Cocoanut, is a very erishable material and only employed by the ery poor. In the Dekhan a long grass is chiefy used. The Karens in Burmah use the large almated leaf of a tall wild palm, a species of *Livistonia*, but the Europeans and Burmese use he leaves of the "Nipa." The Karens in Amherst rovince employ the tall grasses "*Imperata Cy-indrica*," "*Saccharum Cylindricum*," and *S. Spontaneum*. *Ed.* Long grasses and Sedges (*Arunlo, Saccharum* and *Scleria*,) are cut and stacked long the water's edge of the Burhampooter in uge brown piles, for export and thatching.—*Hooker*, *Him. Jour. Vol.* II, *page* 373.

(8151) THEA, a genus of Plants belonging to he tribe *Camelliæ* and natural order *Ternstromiceæ*, which has been so named from the slightly ltered Chinese name of the dried herb which now orms the almost universal beverage of the Briish Isles. Though now so extensively employd, the introduction of tea into Europe is of omparatively recent origin. Tea however must ave been used in China from very early times. It s differently named in different parts of China, as cha, or Cha, also Tha, whence we have Tsia, The, and Tea. In Persian works in use in ndia, tea is called Cha-i-Khutai, or Tea of Cahay. The genus *Thea* is characterised by aving a calyx which is persistent, without racts, 5-leaved, leaflets imbricated, the outer nes smaller; petals of the corolla 6 to 9, ypogynous, imbricated, the inner ones the argest, all adhering together at the base; tamens numerous, in several rows, adherng to the bottom of the petals; filaments filiorm, anthers incumbent, 2-celled, oblong, with thickish connectivum, cells opening longitudinlly; ovary free, 3-celled; ovules 4 in each cell, nserted alternately into the central angle, the pper ones ascending, the lower pendulous; tyle trifid, stigmas 3, acute; capsule spheroidal, -3-lobed, 3- or by abortion 2-celled, with loculiidal dehiscence, or with the dissepiments formd from the turned-in edges of the valves; eeds solitary or rarely two, in cells, shell-like esta, marked with the ventral umbilicus; otyledons thick, fleshy, oily; no albumen; radicle ery short, very near the umbilicus, centripetal. he genus *Camellia* is usually considered to be ery distinct from *Thea*; indeed by Cambessedes he two are separated from each other by everal intervening genera: they are however oo closely allied to allow of this separation. istinctions have been made in the fruit of he two genera. That of *Thea* is 3-lobed with btuse corners, and opening along the middle f the lobes, that is, having the dissepiments pposite to the valves, or, as expressed y modern botanists, having a loculicidal dehisence. *Camellia*, on the contrary is described as having its fruit obscurely triangular, without any tendency to become deeply 3-lobed, with the margins of the valves turned inwards and forming the dissepiments, which thus alternate with the valves, and have what is now called a septicidal dehiscence. Mr. Griffith, on the contrary, who is well qualified to form a correct opinion, states, from examination of the Assamese tea-plant and of two species of *Camellia* from the Khosiya Hills, that there is no difference between *Thea* and *Camellia*. The dehiscence in both, he says, is of the same nature, that is, loculicidal, and the only difference that does really exist is simply of specific value, consisting in the fruits of the tea-plant being 3-lobed, of the *Camellia* triangular. The species of the genus *Thea* are few in number; some botanists are of opinion that even these are varieties of a single species.—*Eng. Cyc.*

(8152) THEA ASSAMENSIS, the Assam Tea-Plant, which some years ago began to attract so much attention, seems to partake of the characters of both the foregoing. The Calcutta Tea Committee say, in 1835, "We are now enabled to state with certainty, that not only is it a genuine tea, but that no doubt can be entertained of its being the identical tea of China, which is the exclusive source of all the varieties and shades of the tea of commerce." To this it may be replied, that there are considerable doubts whether the teas of commerce are all derived from one species of plant. Mr. Griffith says, in the size both of the plant and of the leaves, as well as in the texture of these last, and in its stations, the Assamese plant approaches to the green tea-plant of China; in its geographical distribution, so far as latitude is concerned, it approaches to the black tea. The inflorescence of the Assamese plant varies, but perhaps its usual state is to have the flowers solitary in the axils of the leaves, but the number of flowers varies from one to five. The plants introduced into England have their leaves much larger and thicker than those of the green tea plant, and Messrs. Loddiges find that it requires a much greater degree of heat, in fact that of the hot-house, while the others are in the open air for a great part of the year.

Two other species, described by Loureiro, are little known, as

(8153) THEA VIRIDIS, a large, strong-growing, almost hardy plant, with spreading branches, its leaves three to five inches long, thin, almost membranous, very broadly lanceolate, light green and wavy, with large and irregular serratures, the flowers large, usually solitary, mostly confined to the upper axil, with 5 sepals and from 5 to 7 petals; fruit nodding. This species is figured by Dr. Lettsom in his account of the tea-plant, t. 1. and by Sir W. J. Hooker, 'Bot. Mag.,' t. 3148, and in Loddiges' 'Bot. Cap.,' t. 227, all from plants which have flowered in England. Kæmpfer supplies a very good figure, 'Amœn. Exot,' p. 607, from a Japanese plant. This species is found both in China and Japan, and is supposed to be the species which yields the green tea of commerce. It has been long introduced into England, having been first sent from Japan in 1687 to the Cape of Good Hope, and thence into Europe.—*Eng. Cyc.*

(8154) THEA BOHEA—is a smaller plant than *T. viridis*: its branches are stiff and straight, its stem erect, the leaves not above half or two thirds of the size of the former species, elliptical oblong, perfectly flat, more coriaceous, of a dark green colour, with small and even serratures; they are numerous, and have in their axils two or three flowers, of 5 sepals and 5 petals: these are smaller and have a slight fragrance, and flower later in the season than *T. viridis*. The plant is much more tender than the green tea-plant, and unable to stand the cold of an English climate. It is supposed by some to yield the leaves which are converted into black tea, and, notwithstanding contrary statements, leaves similar to those of this plant may be recognised on infusing and spreading out the leaves of some of the black teas of commerce. [TERNSTROMIACEÆ.] A variety of this is sometimes called *T. stricta*. It is figured by Lettsom, ed. 2, p. 41, who considers it only a variety of the former. It is also figured by Loddiges, 'Bot. Cab.,' t. 226, who, as well as Sir W. J. Hooker and Dr. Royle, considers it to be a distinct species.—*Eng. Cyc.*

(8155) THEA COCHINCHINENSIS, about eight feet high, having lanceolate leaves, flowers of three to five sepals and five petals, solitary, terminal; found wild in the north of Cochin-China, where it is also cultivated being used medicinally by the natives as a diaphoretic.

(8156) THEA OLEOSA is also a shrub of eight feet high, found in the fields in the neighbourhood of Canton, and named from its seeds yielding a large quantity of oil, which is used for burning and as an article of diet. The leaves are lanceolate, the flowers of six sepals and six petals, peduncles 3-flowered, axillary; fruit stated to be indehiscent, rather a berry than a capsule.—*Eng. Cyc.* See TEA.

(8157) THEACEÆ, *Mirbel.* CAMELLIEÆ *Dec.* a tribe of TERNSTRŒMIACEÆ.

The genus Thea forms a small group of plants with Camellia, and is remarkable for containing the plant or plants which yield the different kinds of Tea imported from China. The question was long undecided whether all the kinds of Tea are made or can be made, from the same plants, by variations in the process; or whether it is perferable to have different varieties or kinds of plant for the distinct varieties of Tea, as, for instance, the Green and Black Teas; whether these were originally distinct species, or varieties owing to difference in soil, climate, or culture. Dr. Royle has always been inclined to think the latter more probable opinion, as fully detailed in "Illustr. of Himalayan Botany," p. 107 to 1 and in his "Productive Resources of India," 257 to 311. Two plants are known in gardens: one called *Thea viridis*, supposed yield Green Tea, including—1. Imperial. 2. Gu powder. 3. Hyson. 4. Young Hyson. 5. Twank This kind is capable of withstanding a grea degree of cold, and survives through the win in the open air in Great Britain, as may be se in Kew Gardens. Green Teas we know are chi ly produced in the more northern districts China. Some are factitiously coloured w Indigo and Sulphate of Lime, and Mr. Waringt has ascertained that of the Green Teas of commer some are *unglazed*, others *glazed*. The form are of a yellow, brown tint, tending on the r bed parts to a blackish hue without a shade green or blue; while the *glazed* are faced or cov ed superficially with a powder consisting of Pr sian Blue and Sulphate of Lime, or Kaolin, wi occasionally a yellow or orange-coloured veget ble substance. Indigo with Gypsum is son times used, as by the China tea-makers sent Assam. Even the *unglazed* have a little Sulpha of Lime attached to their surface, either to as an absorbent of moisture, or to give t bloom chracteristic of the green teas of co merce. The *Thea Bohea* appears distinct as species from the former, and has been suppos to yield the different kinds of Black Tea, that Pekoe, Lapsang, Souchong, Congou, Bohe &c., the last being the inferior, and t Pekoes the best kinds of Black Tea. Plan collected in Chusan are somewhat intermedia in character. That growing wild in Assam considered by some botanists to be another di tinct species of Thea or of Camellia. But t information is too defective for any decisive o nion to be formed. If we compare the rece analyses as that of Mulder, *v.* Pereira, Treati on Food and Diet, p. 394, of green and Black Tea, it would appear that a less degr of heat and younger leaves being employe would explain some of the differences b tween Green and Black Tea.

Some Tea has been manufactured in t Government Nurseries in Kemaon from plan grown from China seed, which has been pr nounced of the finest quality by the best Judge and compared with the Oolong Teas of t Ankoy district. Some prepared in August, 184 in the Tea Nursery in the Deyra Doon, has als been pronounced of fine quality, and compare with Orange Pekoe.

The properties of Tea depend chiefly o the presence of Tannin, of a Volatile Oi and of principle called *Theine* ($(C_8H_5N_2O_2$ which has been found to be identica with *Caffeine* and is a salifiable base. I may be obtained in white silky needles, has nild bitter taste, is soluble in hot, but spar- ngly so in cold water and Alcohol. With ulphuric acid and hydrochloric Acid, it orms crystalline compounds, and is suppos- d to exist in Tea in combination with Tannic cid. The quantity of Tannin is stated by rande, and as appears by the taste, and in the nalyses of Mulder, to be greater in Green than n Black tea. Sir. H. Davy and others have tated that Black Tea contains the largest pro- ortion of Tannin. The volatile Oil is in larger uantity in the Green than in the Black Tea. ea is well known for its astringent and moder- tely excitant properties, chiefly affecting the ervous system, producing some degree of exhi- ration, and of refreshment after fatigue. Its ffects are well seen in the wakefulness produced, specially by Green Tea, in those unaccustomed o its use. But it is thought by some to act as sedative on the heart and blood-vessels ; or, as r. Billing explains it, Tea and Coffee are sedatives nd relieve the stupor produced by stimulants, or he drowsiness of fatigue, or other plethora, nly by counteracting the plethoric state of the rain induced by the continued stimulation of ction—thus merely restoring the brain to its ormal state. Liebig (*Anim. Chem.* p. 179) has uggested that *Theine*, as an ingredient of diet, ay be useful in contributing to the formation of aurine, a compound peculiar to Bile. Besides eing useful as a diluent, it may often be pre- cribed as an agreeable and refreshing beverage ; some cases, especially when made strong, cting as an excitant, and at other times produc- g sedative and calming effects.—*Royle.*

(8158) THENG-BAN-SHA, a bast of Arra- an. Coarse looking, and of a reddish brown olour, but divisible into a number of very thin ayers, with a good deal of flexibility and some ughness.—*Royle.*

(8159) THEOBROMA (from θεὸς and βρωμα, he food of gods), a genus of Plants belonging the natural order *Sterculiaceæ*, (*Byttneriaceæ*, . *Brown*,) the species of which yield the ocoa of commerce. They are trees with rge simple leaves and with the flowers in lusters. The calyx is composed of 5 se- als; the petals are 5, lengthened into a strap-like rm at the apex ; the stamens are 5, each with ouble anthers and a horn-like appendage be- ween each filament ; the style is filiform, with a -parted stigma ; fruit a 5-celled capsule without alves ; seeds imbedded in a soft pulp ; no albu- en, and thick oily wrinkled cotyledons.—*Eng yc.* There are several other species of *Theobroma*, ielding seeds possessing the properties of the ove, but they are not cultivated or employed to e same extent. They are all of them natives of outh America, and used by the inhabitants where ey grow as food. *T. Guazuma* of Linnæus, the astard Cedar, or Orme d'Amerique, now the *G. ulmifolia*, is a native of the West Indies, and is a handsome tree resembling the elm.—*Eng. Cyc.*

(8160) THEOBROMA CACAO, Common Cacao, or Chocolate Nut-Tree, has entire, elliptic, oblong, acuminate, quite smooth leaves, and oblong smooth fruit. This tree is indigenous in South America, and is generally found at a height of 600 feet above the level of the sea. It is however extensively cultivated in the West Indies, and in the tropical parts of Asia and Africa. The Mexicans call the tree Chocolalt, hence our word Chocolate for the prepared seeds. The capsules of the fruit are large, and contain each about 25 seeds : the pulp in which these are enveloped has a sweet and not unpleasant taste, and is frequently eaten where the tree is grown. The trees are evergreens, and bear fruit and flowers all the year through, but the usual times for gathering the fruit are in June and December. The cotyledons of the seeds contain a large quantity of oily albumen, which has an agreeable flavour, and on this account they are not only used as a principal article of diet by the natives of the countries in which they grow, but are now used for the same purpose throughout the civilised world. The composition of these seeds in which amylaceous matter is combined with oil, and a principle, called Theobromine, similar in its constitution to Thein and Caffein, is well adapted, when combined with sugar, to form a valuable article of diet. The oil contained in the seeds is sometimes obtained separately, and called cocoa-butter. It may be obtained easily by expression, especially if hot water is added. It is said to be very nutritive, and to act as an anodyne It is particularly recommended for making ointments. (Ersch and Gruber, ' Allgem. Encycl.,' art. Cacao.)—*Eng. Cyc.* This plant is described somewhat differently by Dr. Royle. He says, it is interesting in consequence of its seeds being largely employed in diet. The tree is a native of Mexico, but extensively cultivated in the West India Islands, and remarkable for its large and oval, yellow, cucumber-like capsules, hanging from the sides of the trunk and branches. These are divided into 5 cells, each filled with 8 to 10 ovoid seeds, piled one upon another, and covered by a membranous and succulent aril. There are several varieties of these seeds or *nibs*, which are more or less esteemed. The kernels of the seeds yield by pressure about one half their weight of a fatty oil, commonly called *Butter of Cacao*, at one time much lauded for its medical properties. The seeds, pounded, digested, and boiled with water, with the oil skimmed off, and sweetened with sugar and milk, afford a wholesome and agreeable beverage. The Cacao sold in the shops consists either of the roasted kernels and husks, or of the husks only, ground to powder ; it is sometimes made from the cake left after expressing the oil from the beans. "Much of the cheap stuff sold under this name, is very inferior, being made with damaged nuts that have been pressed for the oil, mixed with potato-flour, mutton-suet, &c." (*Cooley.*) *Flake Cocao* is Cocao ground, compressd, and flaked by machinery. CHOCOLATE (from the Indian name *chocolalt*) is made by triturating in a heated mortar the roasted seeds without the husks, 10 lbs. with an equal quantity of Sugar, and about 1½ oz. of Vanilla, and 1 oz. of Cinnamon (*Cadet*) into a paste, which is put up in various forms. "The mass of the common Chocolate sold in England is prepared from the cake left after the expression of the oil, and this is frequently mixed with the roasted seeds of ground peas and maize, or potato-flour, to which a sufficient quantity of inferior brown sugar, or treacle, and mutton suet is added to make it adhere together.—*Royle.* The chocolate-nut tree is seen in Tavoy gardens, and it brings its fruit to perfection.—*Mason.* This tree has been introduced into Travancore, where it thrives well, the fruit is round but smaller than that produced in South America.—*Riddell.* It thrives well in the Calcutta Garden. The nutritive properties of chocolate depend on a concrete oil or butter of most agreeable flavour, of which 1000 parts of the seed yield 386.—*O'Shaughnessy, page* 227. See CACAO.

(8161) THERMOMETER. The subjoined Table shews the boiling points of distilled water at different elevations, up to 17,455 feet :—

Thermometer. Degrees.		*Elevation.* Feet.	*Thermometer.* Degrees.		*Elevation.* Feet.
212	=	0	195	=	8953
211	=	529	194	=	9502
210	=	1021	193	=	10,053
209	=	1534	192	=	10,606
208	=	2049	191	=	11,161
207	=	2566	190	=	11,719
206	=	3085	189	=	12,280
205	=	3607	188	=	12,843
204	=	4131	187	=	13,408
203	=	4675	186	=	13,977
202	=	5185	185	=	14,543
201	=	5718	184	=	15,124
200	=	6250	183	=	15,702
199	=	6786	182	=	16,234
198	=	7324	181	=	16,868
197	=	7864	180	=	17,455
196	=	8407			

O'Shaughnessy, p. 37.

(8162) THESPESIA, a genus of Plants belonging to the natural order *Malvaceæ.* The species are trees with large entire leaves. The calyx is truncate, and girded by a 3-leaved deciduous involucel ; the fruit is a capsule with 5 cells and each cell is semi-parted, with 4 seeds at the base.—*Eng. Cyc.*

(8163) THESPESIA POPULNEUS, *Malvaceæ*, Icon. 8.

Poorsha or Pooverisha, TAM.	Gungarauvee, TEL. Bupariti, RHEED.

The Fruit.

Poonrsung-kai, TAM. Paris KaPhul, DUK,	Ghengheravie Kaia, TEL. Poostpa, asvudum, SANS.

The Wood.

Gungarave wood ENG. Gungaravae kurra, TEL.	Pao varasa marum. TAM.

Thespesia populnea, Poplar Thespesia, has roundish, cordate pointed 5-7-veined leaves, with dot-like scales beneath, with the peduncles equal in length to the petioles. This plant is a native of the East Indies, Guinea, and the Society Islands ; and is known, where it grows amongst British colonists, as the Umbrella-Tree and Tulip-Tree. It attains a height of about 40 feet, and has large yellow flowers with a dark-red centre. In the tropics it has gained for itself a sacred regard, and is planted about monasteries and convents ; hence the name Thespesia (divine). There are two species, natives of South America : they are all trees, with handsome showy flowers.—*Eng. Cyc.* This has been introduced into Tenasserim from the Madras Coast, and is quite an ornamental tree. Linnæus very appropriately named it the poplar hibiscus, for it has the leaves of the poplar with the flower of the hibiscus.—*Mason.* It is much used for avenues, being of quick growth, and yielding good shade This generally grows from the cuttings, and although the timber is strong, hard and durable, but rarely to be met with good, owing to the trees rotting at the heart. The tree abounds in old gardens, and about all European Stations, thriving best near the sea. (Wight, No 79, Mysore 9, Palamcottah 252, Hort. Garden 30.)—*M. E. J. R.* It furnishes a strong, hard and durable timber, but rarely to be met with good, owing to the trees rotting in the heart, it grows best near the Coast.—*Wight.* The juice of the fruit of this tree is said by Ainslie to be used as an external application in certain cutaneous affections and carapangs of children and a strong decoction of the bark is employed as a wash in the same complaints. The powder of the bark is prescribed, internally, as an alterative, *Ains. Mat. Med. p.* 103. &c. it affords a good wood for chairs &c. it is lighter than most woods, good colored, tough and takes a good polish.—*Rhode's M. S. S.*

(8164) THEVETIA NERIIFOLIA, EXILE TREE. Yellow Oleander.—This plant is common in the gardens of the Deccan ; grows to the height of ten or twelve feet, with long tapering leaves ; it is grown from seed, and blossoms throughout the year.—*Riddell.* It is a common ornamental shrub, in Calcutta. Its juice is acrid. Two grains of its bark has been affirmed to be equal to an ordinary dose of Cinchona. Ind. Ann. No. 6. Of this garden shrub called the "Exile," the wood is worthless. (Hort. Garden 17.)—*M.E.J.R.*

(8165) THOMBATY. Oleum Cucumis Colocynthis.

(8166) THORN APPLE. Datoora.

Jowz-mazel, Arab.
Kala Datoora, Beng.
Kaloo-attana, Cyng.
Kechubooh, Egypt.
Pommespineuse, Fr.
Stechapfel, Ger.
Datoora, Guz. Hind.
Datura stramonium, Lat.
Hummatoo, Mal.
Umana, Maleal.
Gooz-giah, Bunjdeshtie, Pers.
Kechubung, Rotccu. bung, Mal.
Dutro, Port.
Krishna Dhatura, Sans.
Tatura, Turk.
Karoo Oomatay, Tam.
Nulla Oomatic, Tel.

The whole plant (*Datura fustuosa*), has a rank odour, which may be detected at a distance. All parts possess medicinal properties. The seeds are brownish or black, flattened, kidney shaped, without odour, except when bruised, and have a bitter weakish taste . For the purpose of facilitating theft, and other criminal designs, the seeds are frequently given in India with sweetmeats, to stupify merely, but not with the intention of killing : although there is no doubt that for the latter purpose it has also been used. The root, dried leaves, capsules, and seeds of the Datura plants, are recommended by European medical practitioners in India, to be smoked in cases of spasmodic asthma.—*Faulkner.*

(8167) THREAD.

Garen, Dut.
Fil, Fr.
Zwirn, Ger.
Refe, It.
Dagha Guz. Hind.
Fio, Port.
Nitki, Rus.
Hilo, Torzal, Sp.

Thread is formed by twisting together fibres of cotton, silk, or flax.—*Faulkner.*

(8168) THRYSSA. thryssa-anchovy. The genus thryssa, says Swainson, " has the general aspect of the anchovy, "engraulis," but the body is broader, the mouth enormous, and opening almost vertical." The species that inhabits Tenasserim waters may be denominated the thryssa anchovy.—*Mason.*

(8169) THUJA, or THUYA, a genus of Plants belonging to the natural order *Coniferæ.* This name is derived from θύω, as, on account of the pleasant odour given out by the wood in burning, it was used in ancient sacrifices. The species of this genus are more commonly known by the name of *Arbor Vitæ.* It belongs to the section of *Coniferæ* called *Cupressinæ* by Richard, in which *Cupressus*, *Callitris*, *Taxodium*, and *Juniperus* are also included.—*Eng. Cyc.*

(8170) THUJA ARTICULATA of Desfontaines is now called *Callitris quadrivalvis*, Four-Valved Callitris. The genus *Callitris* differs from *Thuja* in having the scales of the female catkins, from 4 to 6 in number, opening like the valves of a regular pericarp, and the seeds at the base of these scales winged on the margin. The Four-Valved Callitris has flattened articulated leaves ; the female catkin with 4 oval pointed valves, 2 of which have seeds. It is a native of Barbary, and attains a height of from 15 to 20 feet. It was first discovered by Desfontaines on Mount Atlas in 1796. [Callitris.]—*Eng. Cyc.* Thuya articulata, is of middling height, sometimes reaching 15—20 feet ; according to Schoust this tree produces the vernix, or sandarac.—*O'Shaughnessy, page* 621. Sandarach occurs in round or elongated tears, whitish or pale citron yellow, brilliant, transparent and limpid, brittle under the teeth, burns with a clear flame, soluble in alcohol and difficultly so in turpentine, odour, agreeable on burning Taste resinous and slightly balsamic used in varnishes, and its powder to prevent ink from spreading through unglazed or eroded paper. In Sweden a sandarac is sold, which is certainly supplied by one of the junipers of that country : indeed M. Fee assures us that the common junipers secrete a similar resin ; he therefore considers its reference to the Thuya as extremely doubtful.—*O'Shaughnessy, page* 621.

(8171) THUJA ORIENTALIS, Oriental or Chinese Arbor Vitæ, has 2-edged branchlets ; imbricated ovato-rhomboid adpressed leaves, furrowed in the middle and in 4 rows ; the canes elliptic, with the interior scales blunt, and mucronate beneath the apex. It is a native of rocky situations in Siberia and China and on the mountains of Japan.—*Eng. Cyc.*

(8172) THUJA PENDULA, Pendulous or Weeping Arbor Vitæ, has opposite decussating spreadinglanceolate, mucronate keeled, somewhat distant leaves ; globose cones ; convex, smooth scales ; filiform pendulous branches. It is a native of Tartary, and is an elegant shrub.—*Eng. Cyc.*

(8173) THUNBERGIA (in honour of Thunberg the botanist), a genus of Plants belonging to the natural order *Acanthaceæ.* It has a double calyx, the outer one 2-leaved, the inner about 12-toothed. The corolla is campanulate ; the capsule beaked and 2-celled. The species are handsome climbing plants with a fragrant odour, (*Eng. Cyc.*) with white, yellow, and blue flowers ; they require a free rich sandy soil and plenty of drainage. The large varieties with blue flowers should be planted out and trained upon Pillars, trellises or trees. Nativesof the Tropics ; raised from seeds, cuttings, layers, and suckers. —*Riddell.*

(8174) THUNBERGIA ALATA, Acanthaceæ.—These climbing plants bear flowers of various colours. The T. Grandiflora hangs in beautiful blue racemes, and is adapted for covering trellis work. The species are grown from seed, in any good soil.—*Riddell.*

(8175) THUNBERGIA FRAGRANS has a climbing stam, with cordate acuminate leaves somewhat angular at the base.

(8176) THUNBERGIA GRANDIFLORA has large flowers with no inner calyx; the leaves are angular, cordate: the anthers bearded and spurred. This and the former species are natives of the East Indies.—*Eng. Cyc.*

(8177) THUNBERGIA, Thunbergia. A large creeper with azure flowers belonging to the genus thunbergia is a conspicuous plant in the forests. I do not find the species described in any of the books to which I can refer.—*Mason.*

(8178) THYMELACEÆ, *Daphnads*, a natural order of Plants belonging to the tubiferous group of Incomplete Exogens. The name of this order is derived from *Thymelæa*, a plant spoken of by the ancients, and which some have supposed to be the *Daphne Gnidium*, a plant belonging to the present order. This order consists of shrubs or small trees, very rarely herbaceous, with non-articulate sometimes spiny branches having a very tenacious bark. The leaves are entire, simple, without stipules, and alternate or opposite. The flowers are capitate or spiked, terminal or axillary, occasionally solitary; the calyx is tubular, coloured, 4-cleft, with an imbricate æstivation; the stamens are 2, 4, or 8 in number, inserted into the tube with 2-celled anthers, dehiscing lengthwise in the middle; the ovary is solitary, with a solitary pendulous ovule. The fruit is hard and dry, or drupaceous. The seed has little or no albumen, a straight embryo, with a short radicle and entire cotyledons. This order is related to *Santalaceæ*, from which it differs in its inferior calyx. It is also allied to *Elæagnaceæ* and *Proteaceæ*, from both of which it is distinguished by its pendulous ovules. Lindley refers to this order Partling's *Anthoboleæ*, on account of their superior fruit. The species are found in Europe, but are not common; they occur in greatest abundance in the cooler parts of India and South America, at the Cape of Good Hope, and in Australia. The most prominent property of this order is their causticity, which resides in their bark. When applied to the skin it produces vesication, and pain in the mouth when chewed. The bark of several of the species is very tough, and may be manufactured into cordage. *Passerina tinctoria* yields a yellow dye, which is used in the south of Europe to colour wool. The various species of *Daphne* possess active properties; some are used for dyeing, some are poisonous, and the *Daphne Lagetta* is the Lace-Bark-Tree of Jamaica. [Daphne.]—*Eng. Cyc.* According to Dr. O'Shaughnessy, this order of plants is very uniform in character, and is formed of shrubs or herbs with simple and alternate leaves, axillary or terminal flowers. Its most remarkable genera are the Daphne, Lagetta, and Dirca, from which some valuable medicines, and the celebrated Nipal paper are derived. Plants of this order are common in the central parts of temperate latitudes, and abound in the mountainous regions of Asia. A few are found in tropical latitudes, as Linostoma in Southern India. On the other hand, species of Daphne are common in the coldest latitudes. An acrid stimulant principle abounds in most of the species hitherto examined, and which possesses very valuable medicinal properties, though not devoid of dangerous powers, if taken in excessive doses. A crystaline substance named *Daphnine* has also been separated from the bark of some species of Daphne.—*O'Shaughnessy, page* 599.

(8179) THYMUS (θύμος) the name of a genus of Plants belonging to the natural order *Lamiaceæ* or *Labiatæ*. It has an ovate bilabiate calyx with 13 ribs; the upper lip is trifid, the lower lip is bifid with ciliated subulate segments, and throat villous inside; the corolla with the upper lip erect, nearly plane, notched, lower patent and trifid; stamens straight, exserted; anthers 2-celled, styles bifid at apex. All the species are small under-shrubs with usually purplish flowers. Between 20 and 30 species have been described by botanists, most of them inhabitants of Europe, especially the region of the Mediterranean: one only is a native of the British Isles.

(8180) THYMUS CHAMÆDRYS, Wild Thyme, or Mother-of-Thyme, is a suffruticose plant, with whorled or capitate flowers, branched decumbent stems with plain ovate obtuse entire petiolate leaves, more or less ciliated at the base; upper lip of the corolla ovate, 4-angular; upper lip of the calyx with short ovate-lanceolate leaves, with subulate ciliated teeth. It is a native of Great Britain, on hills and in dry pastures, and throughout Europe and the north of Asia. This plant has the same sensible properties as the last. One of the varieties is known by the name of Lemon-Thyme, on account of its scent resembling the lemon.

(8181) THYMUS MASTICHINA, Mastich-Thyme, or Herb-Mastich, has ovate or oblong obtuse petiolate leaves, narrowed at the base and not ciliated; the calyx is villous, with feathery subulate teeth, which are longer than the tube. It is a native of dry sandy uncultivated places in Spain, Portugal, and Barbary. It exhales a sent resembling mastich. It is the Marum Vulgare of older botanists, and at one time had some reputation as an Errhine.—*Eng. Cyc.*

(8182) THYMUS SERPYLLUM, Linnæus, appears to be different from the above, having uniformly hairy prostrate creeping stems distinct from the ascending capitate flower-stems. It is not a native of Great Britain. Thymus Serpillum is mentioned in the Ben. Ph. 228.

(8183) THYMUS VULGARIS, Common or Garden Thyme, Ipar, Hind: is an erect plant, or sometimes procumbent at the base, or clothed with a hoary pubescence; the leaves are sessile, linear, or ovato-lanceolate, acute, with revolute edges, fascicled in the axils; the teeth of the upper lip of the calyx are lanceolate, but the segments of the lower lip are subulate and ciliated. This plant is a native of the south-west parts of Europe, in dry plains and on hills, and uncultivated places free from woods. It is very much branched, and has purplish flowers. This species is cultivated for culinary purposes, and many varieties of it are met with in gardens. It has a pungent aromatic odour and taste.

Thymus vulgaris is a delicate plant to rear. Is best performed by seed, but it may be increased by slips, and dividing the root. It requires a rich soil, and the space of six inches between each plant. Best grown in pots. —*Riddell.* It is raised from seed, requires a sandy soil and free drainage, used in soups, &c. —*Jaffrey.*

(8184) TIDES. The usual vertical rise and fall of the tides in the straits of Malacca is from twelve to fourteen feet, while in other parts of the world in the same latitude there is scarcely any variation. The Tides at Singapore correspond in this respect with those in the straits. The vertical rise and fall of the tide upon the coast of Cochin-China varies from six to fourteen feet, and the periods and duration of the ebb and flood are by no means regular. In latitude 12°, on the same shore, there is but one tide in the course of twenty-four hours. It has been said that the tides in the tropics rise and fall very little. Although it is granted that in high latitudes the perpendicular flow and ebb is generally greater than in low, still there are many examples of considerable tides in the latter. At the head of the Gulf of Cambay, in latitude 22°, Horsburg states that the perpendicular depth of the rise and fall of the tides is from thirty six feet at the full and change of the moon. So also, according to the same authority, in Surat road, it is from twenty to twenty-one feet, and from fifteen to seventeen in Bombay harbour, again, in the Gulf of Martaban, which is far within the tropics, the rise and fall of the tide, at the full and change of the moon, is twenty-three and twenty-four feet, and of Rangoon bar about twenty or twenty-one feet. In Gasper straits, within 2½° of the equator, there is occasionally, from local causes, a rise and fall of sixteen or seventeen feet on the spring tide, but this is rare in places so near the equator. These instances, all from Horsburg, show that very considerable tides occur within the tropics.—*American Expedition to Japan, pages* 148 *and* 156.

(8185) TIELLA in Malayala and Tamil, a tree which is not much known in Ceylon. It grows from eight to twelve inches in diameter. It is used by the natives in the frames of country boats; and, from its strength and durability, is found to answer the purpose well.—*Edye, Ceylon.*

(8186) TIGRIDIA CONCHIFLORA. IRIDEÆ. Tiger Flower. These beautiful flowers are grown like other lilies, the flowers open in the morning, and are of a short duration: a second blossom appears on the same stem about the third day after the first has withered.—*Riddell.*

(8187) TIL. SESAMURM ORIENTALE.

(8188) TILES.

Tuiles, FR.
Dachziegel, GER.
Kuprail, GUZ. HIND.

Tegole, Embriei, IT.
Tscherepiza, RUS.
Tejas, SP.

Tiles are made of clay, and baked in an oven or in the open air, to harden them. They are of various shapes and sizes, and are used chiefly for covering roofs, and occasionally also, for paving floors and making drains.—*Faulkner.*

(8189) TILIACEÆ, *Lindenblooms,* a natural order of Plants belonging to the syncarpous group of Polypetalous Dicotyledons. This order consists of trees or shrubs, seldom of herbaceous plants, with simple, toothed, alternate leaves, furnished with stipules. The flowers are axillary. The calyx consists of 4 or 5 sepals, which are valvular in æstivation; the petals 4 or 5, with mostly a little pit at their base; the stamens are hypogynous, mostly indefinite, with oval or roundish 2-celled anthers bursting lengthwise; the disc is formed of glands, which are equal in number to the petals and opposite to them; the ovary is single, composed of from 4 to 10 carpels, with a single style and stigma divided into lobes according to the number of the carpels; seeds numerous, with erect embryo, and abundant albumen. This order is nearly allied to *Sterculiaceæ* and *Malvaceæ,* from which it differs in its glandular disc, distinct stamens, and 2-celled anthers. The species, of which there are about 250, are arranged in 32 genera, and are generally diffused throughout the tropical and temperate parts of the globe.

Tiliaceæ possess no active properties; they abound in a mucilaginous wholesome juice. The fibres of the inner bark are very tough, and are used for a variety of economical purposes. [TILIA.] The wood is generally white, light, and tough; that of *Grewia elastica,* is used for making bows in India. The Trincomalee-Wood used at Madras for making the Massoola boats is the produce of *Berrya Ammonilla.* The *Corchorus olitorius* is cultivated in Egypt for use as a pot-herb.—*Eng·Cyc.*

(8190) TIMALIA (Horsfield), a genus of Birds thus characterised:—Bill strong, compressed, deep (altum). Nostrils subrounded. Wings short, rounded. Tail elongated and graduated. Feet strong; hind-claw twice as large as the middle anterior claw.

(8191) TIMALIA PILEATA. Body ovate, rather stout. General colour above, brown with an olivaceous tint; underneath, testaceous inclining to gray. Head capped with saturated chestnut. Throat and cheeks white. Breast white inclining to gray, marked, with intensely black stripes by the shafts of the plumes. Bill black and shining. Feet brown. (Horsfield.) Dr. Horsfield observes that the species is not unfrequent in the groves and small woods which abound throughout Java. It often, he says, approaches villages and plantations constructing its nest in the hedges; and he speaks of it as one of the social birds that delight to dwell in the vicinity of cultivation. In large forests he did not notice it. He describes its flight as low and interrupted, and adds that wherever it resides it is a welcome neighbour, in consequence of the peculiarity and pleasantness of its note, which consists of a slow repetition of the five tones of the diatonic scale (C, D, E, F, G), which it chants with perfect regularity, several times in succession, and at small intervals of time. Dr. Horsfield further remarked that the sixth tone was sometimes added; but as this required apparently an extraordinary effort, it was by no means so agreeable to a musical ear as the simple repetition of the five notes, which appear to be the natural compass of the bird's organs. ('Zoological Researches in Java.')

(8192) TIMBER TREES, TIMBER AND FANCY WOODS OF EASTERN AND SOUTHERN ASIA.—The preservation of the Forests of India and the search for timbers and fancy woods, suitable for the purposes of the State and wants of the people, have long been objects of attentive interest to the Governments of the several Presidencies in India. Amongst the earliest of the scientific investigators we find recorded the names of Dr. Roxburgh, Dr. Ainslie, Dr. Wallich, Dr. Royle, Dr. Gibson, Dr. Falconer, Dr. McClelland, Mr. Graham, Dr. Wight, and Revd Mr. Mason; while Mr. Edye, Colonel Frith, Captain Dance, and Mr. Rohde, may each be mentioned as having applied a large practical knowledge of the qualities of timber, to ascertain the woods suitable for the manufacturing industries of India. The course adopted by the principal of the scientific inquirers in identifying the plants, has been to endeavour to identify the tree botanically, and then supply the names by which it was familiarly known to the people of the country, and there is no doubt that if not the only proper mode, it is a more correct method than to endeavour to trace out the botanical name of a plant from its native name. In following the latter course, it is impossible but that, from the twenty or thirty languages spoken throughout the regions of which we are endeavouring to record the products, the same plant must come to be described repeatedly under different names, and true progress will not be made until having properly identified the botanic relations of the plant, the subject be completed by endeavouring to supply all the synonyms by which it is known. The latter is the course that we will try to adopt in arranging the names of the trees producing the Timber and Fancy Woods of India and of Eastern and Southern Asia. One point which practical men should particularly be made aware of is that the vast extent of the regions we are describing, their various climates and physical conditions, render it impossible that the same tree can produce the same quality of timber in every locality where it grows, and this indicates the necessity of not pinning their faith on to any one wood merely because a wood from the same tree, the growth of another district, may have been found highly suitable for the work to which it was put. We would especially ask our ordnance friends to keep this point in view and not to use a wood however lauded, unless the timber have been brought from the same place as it was obtained by those whose praise they act on, or until severe trials has proved that when grown in the new locality, the timber it yields is equal to all that is required of it. As an instance of this, we may cite the majestic teak which grows to an immense height in Malabar, on the Godavery, in Pegu and Tenasserim, proceeds far into the interior of India, and may be seen in the mountains of Bundelcund, but there only in the form of a moderate sized shrub; and even where it presents the same form of a gigantic tree as in Malabar and Pegu, the quality of the timber it yields is essentially dissimilar. The knowledge of this fact renders it necessary that in our observations on the Timber trees, Timber and Fancy Woods of India and of Eastern and Southern Asia, we should not only note the trees generally, but furnish also the names of such as are found useful in certain districts. Our remarks will therefore embrace a few observations on the uses of timber, a list of all the trees known to produce timber in some part or other of the regions we are noticing, and separate lists and notices of the trees of particular districts.

The total annual importation of timber into Great Britain is nearly two million loads, or one hundred million of cubic feet, entered under the several designations of "timber or unsawn wood," "deals and planks or sawn wood;" "teak;" "staves," and "lathwood."

The following Table shows the countries from which wood was chiefly imported in the year 1849.

	Timber.	Deals.	Teak.	Staves.	Lathwood.
Russia,	41,419	173,586	—	325	15,539
Sweden,	28,679	79 843	—	150	1,119
Norway,	28,930	50,805	—	95	103
Prussia,	117,470	35,006	—	19,213	6,169
Hanse Towns,	2,441	68	—	1,012	—
Tuscany,	2,299	9	—	—	—
Papal Territories,	2,106	3	—	—	—
Western Africa,	1	—	9,596	—	—
British India,	1	2	17 459	56	—
Australia,	977	540	1	4	—
British North America,	578,748	468,572	9	45,164	14,813
British Guiana.	4	19	4	103	—
United States,	13,832	839	—	13,309	—
Miscellaneous.	1,002	491	633	36	57
Total Loads .	817,909	809 783	27,702	79,917	37,800

Of the chief woods employed in shipbuilding seven have long been acknowledged as first-rate by the authorities at Lloyd's ; and to this number must now be added an eighth, namely, iron-bark, which has, in fact, only been admitted as a first-class wood since the period of opening the Exhibition in May 1851. These eight woods are,

1 English oak,
2 American live oak,
3 African oak,
4 Morung saul,
5 East India teak,
6 Green heart,
7 Morra,
8 Iron bark.

At the great Exhibition of 1851, the collection of East Indian woods, exhibited by the Honorable East India Company (p. 884) was by far the most extensive series of woods in the whole Exhibition, and constituted a very valuable part of the great collection of Indian raw produce. It was remarkable for the large number of specimens, the excellence of many of them, and the valuable practical information to be gained by their examination. The collection consisted of many hundred specimens, and included several minor or local collections of great interest. Amongst these were the valuable collections of Drs. Roxburgh and Wallich (884,885) ; an extensive series of the woods of the Malay peninsula, Amherst, Tavoy, Tenasserim, Prince of Wales' Island, Assam, Cuddapah, Madras, Orissa, &c.

Considering the extent and importance of Dr. Wallich's collection, the Jury would certainly have awarded to him a medal had not the fact of his being a member of the jury precluded them from doing so. They awarded a Prize Medal to Mr. Commissioner Blundell (p. 885) for a very valuable collection of Amherst woods. They also awarded a Prize Medal to Messrs. Almeida of Singapore (p. 890) for fine specimens of Lingoa-wood and Kaya-buka.

The smaller series of woods contributed by Messrs. A. P. Onslow, of Ganjam ; D. Mayne, of Cuddapah (p. 188) ; General Tulloch, Madras ; Captain Ogilvie of Masulipatam ; Major Maitland, and Colonel Balfour, of Madras ; Dr. Hunter, of Madras ; Dr. Wight, of Coimbatore ; Captain Marquart, of Chittagong ; and J. R. Colvin, of Moulmein (pp 888,891), were also severally deemed worthy of Honorable mention. The nature and properties of many of these Indian woods was very little known in Britain, and though, for the most part, it is not probable that it would be found worth while to import them into Europe, yet their importance to India is every year increasing, and must necessarily continue to do so, as the demand for timber in India for railways and other engineering works increases. For such uses it is desirable, not only that the wood should be strong and not liable to decay from mere exposure to the weather, but, also, that it should work freely, and be able to withstand the ravages of the various insects to which wood of all kinds is more or less exposed in tropical countries. It is true that even the most porous and spongy woods may be rendered to some extent capable of resisting all such influences, by being impregnated with various solutions, but it is obviously far better, when possible, to select such woods as are naturally saturated with resinous and aromatic substances, as in this latter case all cost of preparation is saved, besides that the preserving matter is far more perfectly disseminated throughout the whole of the wood than can possibly be effected by any artificial process after the tree is felled. In examining the comparative value of different sorts of wood, it is of the first importance to ascertain the nature of the encrusting matter deposited throughout the cells and tubes of the wood. For all practical purposes, those woods appear to be best in which the cells are lined with resinous matter ; those filled with hygroscopic gummy matter are, for the most part, of less value ; they are seasoned with difficulty, and are always more liable to decay. The best woods are those having a strong fibre protected from all external influences by a coat of resinous matter, or at least of a matter insoluble in water, and one which does not attract atmospheric moisture. It is probable also, that some of the ornamental and other woods of India will become articles of import into Britain when their properties and uses are better known and appreciated by that country's artizans.—*Jur. Rep. of* 1851.

Timber.—The most important application of wood is in the building and repairing of houses and ships, and in the construction of machinery. For this purpose the larger trees, which come under the denomination of timber, are chiefly employed. Though England long supplied its own wants, increasing population, led to an extensive demand on other countries for the supply of timber, which was met chiefly by vast pine forests on the shores of the Baltic and northern Europe, and also from Canada. Timber from the latter country, however, was soon found to be inferior in strength and durability to that of the north of Europe, and fell into disesteem among ship builders ; hence arose the practice of introducing the words " Memel fir" in specifications for building.

Conservation.—The preservation of growing timber is an art of considerable importance, and can only be said to be cultivated in countries where timber is comparatively scarce.

The practice of thinning out plantations is of importance not only as affording a supply of wood, but, by admitting an increased supply of air and light to the remaining trees, their growth is greatly promoted. Forest trees are often planted on soil that is unfit for other purposes, and by the annual fall of leaves they accumulate in time a certain depth of soil.

Seasoning.—The proper time for the felling of trees is that in which the largest quantity of hard and durable wood can be obtained as free from sap as possible. It is a common fault to fell trees before they have attained their maturity. If suffered to complete their growth they would have the heartwood of equal weight and strength throughout, whereas in those cut down prematurely, the centre wood alone possesses this requisite, the outer concentric rings being considerably softer: such timber may be said to decrease in hardness and strength in arithmetical proportion as it approaches the sap wood. Timber is felled during the cold months, when the natural juices are most inactive and the tree is in a measure dormant. But before the timber can be used, the juices must be got rid of from the capillary vessels, or the wood will remain moist or green for a considerable period, and the planks formed from it will, in a confined situation, become stained, and then subject to decay or dry rot: these effects are prevented by free exposure to dry air. It is usual in the royal dock yards to cut out the timbers for ships of the required shape and dimensions about a year before they are framed together, and the skeleton frame is usually left another year to complete the seasoning. Other mischiefs almost as fatal as decay also occur to unseasoned woods; round blocks, cut out of the entire circular stem of green wood, or the same pieces divided into quarterings, split in the direction of the medullary rays, or radially; also, though less frequently, upon the annual rings. Such of the round blocks as consist of the entire section contract pretty equally, and nearly retain their circular form, but those from the quarterings become oval from their unequal shrinking. In general, woods do not alter in any material degree in respect to length. Boards and flat pieces contract, however, in width; they warp and twist, and when they are fitted as panels into loose grooves, they shrink away from that edge which happens to be the most slightly held; but when restrained by mills, mortises, or other unyielding attachments, which do not allow them the power of contraction, they split with irresistible force, and the materials and labour thus improperly employed will render no useful service." The natural juices of the tree must be got rid of by seasoning in order that the wood may become dry and hard. After the tree has been lopped, barked, and roughly squared, it is left for some time exposed to the weather, and may be soaked in fresh running water (as some think) with advantage, or boiled or steamed. This dilutes and washes out the juices, and the more readily evaporates from the wood at a subsequent period, and the colour of white woods is said to be improved thereby. In this way, fir timber, on its arrival at the port of London, is commonly formed into floats on the Thames, and allowed to remain for some time. When removed from the water, it is left to dry thoroughly before it is taken to the pit to be sawn; usually it is blocked up from the ground so as to have a free circulation of air, and if it be cut into boards, they should be piled one on the other with billets of wood between them, or laid in a triangular form, with their ends alternating so as to allow the air to have free access to them. Thin pieces will be seasoned in about a year, but thick wood requires two or three years before it is removed into the house to complete the drying. The warm air of a stove-heated room will then act upon it with benefit. In the stacking of timber for the purpose of seasoning, the pile should be so far raised from the ground as to allow the air to circulate below, as well as around and through it; and if not sheltered from the rain, care should be taken to prevent the wet from lodging in any part. It is now usual in dockyards to have elevated supports of iron or of stone for the stacking of timber, and ships are now built under covered sheds. The drying of timber should be gradual, for if rapid, it suffers a loss in toughness as well as in pliability: the pores at and near the surface become contracted, and prevent the interior moisture from escaping. Plans for the more rapid drying of timber by means of kilns have, however, been tried, as in Price's patent, in which timber destined for building purposes is placed in a room, into the lower part of which hot and dry air is introduced, and this, charged with the moisture of the timber, is allowed to escape at the upper part. By this, timber can be seasoned in one third of the time required in the open air. Oak loses nearly two fifths of its weight by proper seasoning. The timber should be dry before it is cut into planks, or they would be liable to warp and shrink.

Decay.—The presence of air, light, and moisture seems to be necessary to the re-vegetation of timber or the growth of that fungus which leads to its destruction. Mr. Fincham of Her Majesty's dock-yard bored a hole in one of the timbers of an old ship built of oak, the wood being sound, and in 24 hours the admission of air caused the hole to be lined with a white mouldiness due to the growth of a peculiar fungus, which some time after became so compact as to admit of being withdrawn like a stick. Cracks or splits in timber would therefore predispose it to decay in damp situations by admiting the air. There are great differences in woods as to their power of resisting decay; some perish in a year or two, others are sound and even fragrant for centuries. Teak has been found to last six or seven times as long as oak when used in green houses, as boxes for growing plants, the latter wood not existing more than two or three years; but the moist atmosphere, light and heat of a greenhouse form a severe trial for any wood.

Fancy wood.—In addition to timber-trees,

vast variety of woods are used for orna-
nental purposes. In a series of papers
ontributed by Professor Forbes to the
rt Journal, on "Woods used for Orna-
nent and Purposes of Art," some clear distinc-
ions, definitions, and descriptions are given,
hich Mr. Tomlinson, with the permission of the
ublisher, abridged. The term wood is com-
nonly applied to those portions of the vege-
able axis that are sufficiently hard to offer
onsiderable resistance and solidity, so as to
e used for purposes requiring various de-
rees of firmness and strength. Every flower-
ng plant is composed of an axis, and the
ppendages of the axis; the former consisting
f the stem and root, the latter of the leaves and
lowers. In trees, shrubs, and under-shrubs,
he axis is said to be woody; in herbs it is
ermed herbaceous. In the former, stems are
ermanent, and do not die to the ground annu-
lly, as is the habit of the latter. A shrub, a
ree, an undershrub, a bush, are merely grada-
ions of magnitude in perennial plants; woods
aluable for purposes of Art and Manufacture
re derived from all of them. But as bulk and
limensions are necessary to make timber availa-
le for extensive use, by far the greater part of
ur ornamental woods are derived from trees.
here are, however, some remarkable exceptions.
he wood of roots is different in structure from
he wood of stems, and the same tree may fur-
ish two very different kinds of ornamental
ood, according as they are derived from its
scending or its descending axis. The wood
f the inner portions of a stem may be of
ery different colour and quality from that
f its outer parts. In the immediate neigh-
ourhood of the origin of branches, it may
xhibit varieties of pattern, such as to render
t greatly more ornamental than elsewhere, and
n some cases, when under the influence of morbid
rowth, reveals additional beauties, so as to be
rized for qualities which in nature are defects.
f we take a number of transverse sections of
ood, and compare them one with another, it
vill soon become evident that there are two
rincipal types or modifications of structure.
ompare a cross cutting of Teak or oak or mango
vith a like portion of Palmyra wood, and you
vill see the differences between them strongly
ontrasted. In the former, the layers of wood
re ranged in concentric circles round the central
ith, and are encased externally in a binding
f bark, itself composed of distinct and differently
rganized portions. In the latter there is an
niform appearance throughout the section, the
ubstance not being disposed in concentric rings,
ut appearing as if a bed or ground of one kind
vas studded with specks of another order of tis-
ue. These are not slight dissimilarities, they indi-
ate differences of the greatest structural impor-
ance in the economy of the respective trees. Corresponding with them are peculiar modifications of every portion of the plants organization. The external aspect of the plants of either type is altogether unlike that of the other.

The appearance styled silver-grain in wood is dependent on the cellular tissure of the medullary rays, and is, therefore, exhibited by exogenous woods only. It gives the streaks of glancing satiny lustre, that are so ornamental in many kinds of woods. In the oak and beech this appearance is conspicuous. The inner layers of wood, after the tree has become aged, often become compact, and frequently different in colour from the new wood. They are then styled the heart-wood. Botanists term them the duramen and apply the name alburnum to the outer layers or sap-wood. In the former, the tissues have become dry and dense, and charged with solidifying deposits, so as to prevent them aiding in the ascent of the sap. Often, too, they become more or less deeply coloured, so as conspicuously to contrast with pale sap-wood. This difference is especially conspicuous in the ebony-tree, the black portion of which is the duramen, or heart-wood. In the oak, they resemble ebony. Furniture of exquisite beauty has been constructed of yew-wood; indeed it is admirably adapted for fancy cabinet work, either in mass, or inlaid as veneers: the supply is said, however, to be insufficient. The wood of yew was once extensively used in Britain, in the making of bows.

The cedar is a native of the warmer temperate mountainous regions of Asia. The celebrity of the cedar of Lebanon dates from a very high antiquity; and the reputed value of its timber for ornamental and cabinet purposes, has been placed on record from very ancient times. Either, however, more coniferous trees than one have been included under the popular appellation or the qualities of the wood have sadly degenerated, for that of the existing cedar of Lebanon is by no means remarkable for beauty, durability, or sweetness of odour, all of which properties were pre-eminently ascribed to it. The tree itself is as grand as ever; one of the most majestic of arborescent elements in the landscape. It was extensively used among the ancients. Nevertheless, this wood, such as we now know it, is not one to choose for carving or house construction. It is very light and spongy, of a reddish white colour, scented like ordinary pine, and not at all durable. It is possible that other kinds of coniferous trees were confounded by the ancients with the tree cedar. The Himalayan "*deodar*," a tree very closely related to the Cedar of Lebanon, really possesses all the good qualities, for which the latter has been so long celebrated. Travellers in the East, in writing about cedars, often confound various kinds of arborescent juniper under that name.

The numerous race of pines and firs for the most part are more useful than ornamental, so far as their timber is concerned. Some of them, however, afford wood with many desirable qualities for furniture making.

Among the natural orders that have affinities with catkin-bearing trees, are the Walnut and the Nettle tribes.

The box belongs to the spurge tribe. It produces a warm yellow wood, much used by the turner, and well adapted for the construction of flutes and similar musical instruments. It is the yellow wood which we often use in the shape of rules and scales, and it is also the chief wood employed in wood engraving. It is sometimes beautifully mottled. In Britain we have the box growing wild and luxuriant in Surrey, as at Box-hill, but the chief supply of this wood is derived from the southern parts of Europe, and from Asia Minor. A distinction is drawn between "Turkey" and "European" boxwood. The latter is more curly, softer, and paler than the former. Dr. Royle has called attention to a different species of Buxus, a native of the Himalayas, yielding a wood possessing similar qualities with that in common use, and having the advantage of being found of considerable size and thickness. The ash and the olive are members of the olive family. The former familiar tree yields a timber remarkable for toughness and elasticity, and, excellent for machine and agricultural purposes, but not much used for finer applications. When, however, the grain is zigzag, it is adapted to the making of furniture of considerable beauty. Olive-wood is imported from the Mediterranean countries. It is veined with dark grey, and resembles boxwood in texture, but is softer. The knotted and curled roots are made into embossed boxes. This is done by means of pressure in engraved moulds of metal. The Araliaceæ, a natural order to which the ivy belongs, may be mentioned here incidentally on account of the substance so well known as rice-paper. This was long supposed to be the pith of a leguminous plant; its true nature was not made known until lately, when Sir William Hooker demonstrated that it was the pith of an Araliaceous tree. A living plant had been procured with great difficulty from the Chinese, and was sent to England, but died on the passage. It was said to be exclusively a native of the island of Formosa, but Mr. Fortune found the Aralia growing in other parts, and it was introduced by him into India.

The almond-tree, especially when wild, is said to furnish a valuable wood, but which is little known or used. The great order of leguminous plants, the Pulse tribe, is rich in trees, but not much so in temperate climates, nor is there any ordinary tree of the group upon which stress can be laid. There are now eight descriptions of timber admitted by the English as first-rate for ship-building purposes, and one of these has only been so ranked since the opening of the Great Exhibition. They are :—1, English oak; 2, American live-oak; 3, African oak; 4, Morung saul; 5, East Indian teak; 6, Green heart; 7, Morra; 8, Iron-bark (the newly admitted wood). Of the above the Morung saul is an Indian tree, as well as the better known valuable Teak. The Iron-bark is from New South Wales, and has a density of 1426, and a strength of 1557, (English oak being called 1000).

Wood is very valuable as a fuel: the excess of hydrogen contained in it which, in burning and forming water, requires for equal weights three times as much oxygen as the carbon does in forming carbonic acid, gives out in burning nearly four times more heat than the carbon.—*Tomlinson.*

In all countries most of the woods in general use, have a variety of names, the *local* name varies often in the same district. Many have likewise, a *commercial* name, by which they are known in the Market, as "Trincomallee" wood, "Coromandel" wood &c. These names are sometimes given from the place of export, but often it is impossible to trace their derivation. Lastly, there is the *Botanical* name, the sure determination of which is a matter of the first importance, and the means of doing this consists of a small shoot, bearing flowers, fruit and full grown leaves, either together or separately, pressed flat and dried, so as to be fixed on a sheet of paper.

Size, &c. of the Specimens.—For a complete collection, there should be several of each wood from various localities. 1st, A horizontal section of the tree with the bark complete, and about 3 inches thick. 2d, A plank about 3 inches thick and about three feet long, cut from the log about half way between the pith and heart, the bark, sapwood, &c. being retained. 3d. Two or three bars about 2 feet 6 inches long, 2¼ inches square (if the plant grows so much) cut from the sound wood. 4th. A turned cylinder of hard or ornamental woods, 1 foot long and 3 inches in diameter.

The value of wood depends much on its age, the young tree possesses strength and elasticity in a greater degree than mature, i. e. when it would shortly cease to increase in diameter; as it increases in age it acquires its maximum of stiffness and durability, in its aged state, it will probably best suit the purposes of the Cabinet Maker. The grain of the wood depends greatly on the nature of the soil, being generally straight and open in a tree growing rapidly, in a rich, and the reverse in a poor soil. In some cases, the root affords wood of great resisting power for furniture, the root of a healthy Oak is prepared for spokes of wheels, and veneers from that of an aged specimen, often bear a high value for Cabinet makers purposes. In collecting specimens of the characters of wood there are points to which attention should be directed. viz:

a. The uses to which the several parts of the tree is applied, and those for which experienced Natives consider it specially adapted.

b. Its distribution in the District, the localities where the best is procurable with the nature of the subsoil, the distance from the nearest seaport, or town of any size : whether water carriage be available ?

c. The extent of supply, whether this is increasing by self sown seedlings of fresh plantations, &c. or decreasing? the average size in height and circumference of the native tree, its character, whether straight or crooked, the average length, &c. of the logs or planks, the times required for seasoning, and the amount of seasoned timber generally procurable.

d. The age at which the tree reaches maturity, i. e. when increasing age brings no further increase of diameter. This is a point of great importance, for on it depends the relative value of trees for planting. Thus, supposing there are two species of trees, of equal value as regards timber, &c., but one attains maturity in 25, while the other requires 35 years, it is obvious that the first is much the more valuable of the two : its money value being realised 10 years sooner.

The following is a List of Woods authorized to be used as Railway sleepers, and, in 1855, under trial on the Madras Line.

1—Teak...............	Tectona grandis.
2—Saul	Vatica robusta.
3—Sissoo.......	Dalbergia sissoo.
4—Pedawk	Pterocarpus Indicus.
5—Kurkuttah.........	Zizyphus glabrata.
6—Kurrah Murdah...	Terminalia glabra.
7—Maroothy Marum	Terminalia alata.
8—Aucha Marum.....	Bauhinia diphylla.
9—Vangay Marum...	Pterocarpus marsupium.
10—Kadookay Marum	Terminalia chebula.
11—Neenee Marum........	
12—Myladee Marum......	
13—Sem Marum..........	Soymida Febrifuga.
14—Curroo Vangay or Chella Woongah Marum	Acacia odoratissima.
15—Perumbay Marum....	Prosopis spicigera,
16—Erroovaloo Marum ...	Inga Xylocarpa.
17—VelVangay Marum...	Acacia speciosa.
18—Peela Marum..	Artocarpus integrifolia.
19—Dud Eloopa Marum	Bassia longifolia.
20—Karvalum Marum....	Acacia arabica.
21—Combadree...........	
22—Katoovoye Marum...	

From the various sources of information at command, the following list contains the names of the principal trees which are felled for Timber or Fancy woods throughout the various countries in India and in Eastern and Southern Asia.

Acacia amara, Nulla balasoo, *Tel.* Woonja marm, *Tam.*

Acacia Arabica, Curvala, *Tam.* Tuma, *Tel.* Babool, *Hind.*

Acacia catechu, Wodahalay, *Tam.* Sha, also Kwon-thee, also Sha bin, *Burm.*

Acacia cinerea.

Acacia elata, Seet, *Burm.* Tella sopara, *Tel.*

Acacia ferruginea, Ansandra, *Tel.*

Acacia Halkora, Dulchirram, *Tel.*

Acacia leucophlea, Velvaila, *Tam.* Tella tuma, *Tel.*

Acacia odoratissima, Caroovangay, *Tam.* Telsoo, also Shiuduga, *Tel.*

Acacia Scrissa, Seet, *Burm.*

Acacia Smithiana.

Acacia speciosa, Velvangay, *Tam.* Ped dulchirram, also Dirasa, *Tel.*

Acacia stipulata, Seet, *Burm.*

Acacia suma, Tella Sundra, *Tel.*

Acacia sundra, Currangally, *Tam.* Nulla sundra, *Tel.*

Acacia vera. Andere, *Cyng.*

Adansonia digitata, Papara poolimarum, *Tam.*

Adenanthera pavonina, Kwæ-gyee, also Y-wai-gyee, *Burm.*

Ægle marmelos, Vilvay marum, *Tam,* Oo-Sheet, *Burn.* Maredu, *Tel.* Bael, *Hind.*

Agati grandiflora, Agathy, *Tam.* Pouk-ban, *Burm.*

Agathis loranthifolia.

Aglaia spectabilis.

Ailanthus excelsa, Peru marum *Tam.*

Alangium decapetalum, Alinjee marum, *Tam,* Udugu *Tel.*

Alstonia scholaris, Kori, also Kowun, *Can.* Satween *Mahr.*

Anacardium occidentale, Moontheree Cotty marum *Tam.* Thub-bam-bu, *Burm.* Jidi mamidi, *Tel.*

Anacardium latifolium, at Goalpara. Bheela, *Hind.*

Ancestrolobus carnea. Zoung ali, *Burm.*

Ancestrolobus mollis. yin-bya, *Burm.*

Andrachne apetala.

Anissaphyllum Zeylanicum, Welippiyenna, *Cyng.*

Anogeissus acuminatus. Paussee, also Panchee. *Tel.*

Anogeissus latifolius. Sheriman, *Tel.*

Aponogeton crispum, coeatiye, *Cyng.*

Aquilaria agallocha, Aglay marum. *Tam.* A-Kyau, *Burm.*

Amoora (Aglaia) rohitaea, kha-you also kha-yo, *Burm.*

Antidesma paniculata, By-it-ziu, *Burm.* Jana palseru, *Tel.*

Areca catechu, Camoogoo. *Tam.*

Armosia dasycarpa. Thit-wa-jee *Burm.*

Artocarpus integrifolia Peing-nai, *Burm.*

Artocarpus echinata, Toung Peingnai, *Burm.*

Artocarpus hirsuta, Angelly wood.

Artocarpus pubescens, Aludel, *Cyng.*

Artocarpus chaplasha.

Artocarpus *species* of Tavoy. Pyn-ya-the, also Tana-beng, *Burm.*

Artocarpus sylvestris, Row funnus, *Mahr.*

Atalantia monophylla, Caatyaloo micha marum. *Tam.*
Averrhoa carambola. Zoung-ya, *Burm.*
Azadirachta indica Margosa, Neem Tree ; Vaypum marum. *Tam.* Neem ka jhar, *Hind.* Ka-ma-a-pae, also Them-ba. also Kamakah, *Burm.* Yepa, also Yapa, *Tel.*

Bambusa, Bamboo. Bans, *Hind.*
Barringtonia acutangula, Kyai-tha, *Burm.*
Barringtonia speciosa. Kyai-gyee, *Burm.*
Bassia latifolia.
Bassia longifolia. Elooppa marum, *Tam.* Mee, *Cyng.* Ippee, *Tel.*
Bauhinea brachycarpa. Bwai-jin, *Burm.*
Bauhinea parviflora. do.
Bauhinea, *Species.* Pul.i-Shinta, *Tel.*
Bauhinea racemosa. Arree, *Tel.*
Bauhinea diphylla. Pa-lau, *Burm.*
Bauhinea tomentosa. Petan, *Cyng.*
Betula bhojputra.
Berrya ammonilla, Trincomallee wood, *Eng.* Halmilile, *Cyng.*
Bignonia *Species.* Kala-goru also Chinna kala-Goru, also Mokka yepa, *Tel.*
Bignonia chelonoides, Kala-Goru, *Tel.*
Bignonia suaveolens, do. *Tel.*
Bignonia quadrilocularis, Wursus, *Mahr.*
Bignonia xylocarpa.
Blackwellia spirale.
Blackwellia perpinqua.
Borassus flabelliformis. Palmyrah tree, *Eng.* Htan, *Burm.* Tal, *Cyng.*
Boswellia thurifera.
Briedelia montana. Goonjan murral, *Can.* Assuna, *Mahr.*
Briedelia spinosa.
Bruguiera Rheedii.
Butea frondosa. Pouk also Pouk-pin, *Burm.* Calukeale, *Cyng.* Motku also Modugu, *Tel.*
Buxus, Box.

Calamus, Canes, Ratans. Kyeing-nee, *Burm.* Bade, *Hind.*
Calophyllum longifolium, Thar-ra-bee, *Burm.*
Calophyllum acuminatum, wal-dombe, *Cyng.*
Calophyllum calaba, Gorru-keenee, *Cyng.*
Calysaccion angustifolium.
Calyptranthes cummini, Mahadan, *Cyng.*
Calyptranthes cariophyllifolia, Batte dombe, *Cyng.*
Calyptranthes jambolana, Alubo, *Cyng.*
Canarium geniculatum.
Canthium didymum, Nulla regoo, *Tel.*
Canthium parviflorum. Balsu, *Tel.*
Capparis grandis, Reygutti, *Tel.*
Carapa, *species,* Tai-la- oon, *Burm.* of Tavoy.
Careya arborea, Ban-bwæ, or Baub-wai, *Burm.* Buda-darmee, *Tel.*
Carallia zeylanica, Davette, *Cyng.*
Caryota urens, Kittul, also Nepera, *Cyng.*
Carrallia lucida, Keerpa, *Beng.*
Cassia florida.
Cassia nodosa.
Cassia sumatrana, Arramene, *Cyng.* Mayalee, *Burm.*
Cascaria pentandra, Tha-byai-ywet-kya, *Burm.* Kahatte, *Cyng.*
Casearia, *Species.* Peda kal mesura, *Tel.*
Cassia cinnamomum, Dawol Kuroendoo, *Cyng.*
Castanea indica, Theet-Khaya. *Burm.*
Castanea martabanica of Tavoy, Norne or Zitha, *Burm.*
Casuarina equisitifolia.
Casuarina muricata, Beef-wood tree, *Eng.* Htenroo, *Burm.*
Cæsalpinia Sappan, Teing-nyet, *Burm.*
Cathartocarpus Roxburghii, Uskiamau, also Uri-widdee, *Tel*
Cedrela toona, Toon marum, *Tam.* Thit-kado, *Burm.* Toon, Tunga, Poma, Jeea.
Cedrus deodara, the deodar, *Eng.* Kelon, *Hind.*
Chaulmoogra odorata.
Chickrassa tabularis, Aglay marum, *Tam.*
Chocearpus pungens, Hedde woke, *Cyng.*
Cicca disticha, Nelly, *Cyng.*
Cluytia amona.
Cluytia collina, Woadoogoo marum, *Tam.* Koorseya also koorse, *Tel.*
Cocos nucifera, Tenna marum, *Tam.* Coconnut, *Eng.* Narel ka jhar, *Hind.*
Connarus speciosa, Gwai-douk, *Burm.*
Conocarpus latifolia.
Conocarpus robusta, Bai-byah, *Burm.*
Cordia, *new species.* Botku, *Tel.*
Cordia angustifolia, Chinna Botku, *Tel.*
Cordia myxa, Tha-nat, *Burm.* Irkee also Peda botku, *Tel.*
Cratæva Roxburghii, Ka-dat, *Burm.*
Cupressus torulosa, Cypress.
Cynometra polyandra of Nepaul.
Cynometra, *Species* : Branch flowered, Halmendora, also Galmendora, *Cyng.*
Cyrtophyllum fragrans.

Dalbergia frondosa, Yindike, *Burm.* Peda sooparas also yerra patseroo, *Tel.*
Dalbergia lanceolaria, Nedoon or Nander wood, or Nendoon. *Cyng.*
Dalbergia latifolia. Eroopoottoo, *Tam.* Yindike, *Burm.* Jitigee, also yerroo goodoo, *Tel.*
Dalbergia sissoides, Bitty marum, *Tam.* Yindike, *Burm.*
Dalbergia sissoo, Sissoo, *Tam.* Yindike, *Burm.*
Dalbergia Oojeinensis.
Dillenia augusta, Zinbyewn, *Burm.*
Dillenia scabra, Byew, *Burm.*
Dillenia speciosa, Tha-byew, *Burm.* Peda kalinga, *Tel.*
Dillenia pentagyna, Chinna-kalinga, *Tel.*
Diospyros sylrtica, Nulla kaka mushti, *Tel.*
Diospyros chloroxylon, Ulinda also Yelinda, *Tel.*
Diospyros melanoxylon.

Diospyros racemosa.
Dipterocarpus alatus, Aing, *Burm.*
Dipterocarpus grandiflora, Ain or Ain-tha or Kun-nyan-phin, *Burm.*
Dipterocarpus turbinatus, Horre, *Cyng.* Kan-yeen, *Burm.*
Dodonea viscosa.
Dolichampia pomifera, Douk-ya-ma, *Burm.*
Diospyros hirsuta, Calamander or Coromandel, Calu Medirye, *Cyng.*
Diospyros ebenaster, Ebony, Kudum Berye, *Cyng.*
Diospyros melanoxylon, Ebony, Ouk-chin-ya, *Burm.*
Diospyros, *Species.* Muchi twikee, also Wurungul, *Tel.*
Dombeya melanoxylon, St. Helena Ebony.

Echites lanceæfolia, kiri wala, *Cyng.*
Echites scholaris, Rook attene, *Cyng.*
Ehretia lœvis, Yen-yai-myouk-myee, *Burm.* Pal dautum, *Tel.*
Ekebergia, *species* of Goalpara.
Eleocarpus serratus of Ceylon.
Emblica officinalis, *Usarka, Tel.*
Elæodendron integrifolia, Jouk bin, *Burm.*
Embryopteris glutinifera, Timbery, *Cyng.*
Eriochlæna Hookeriana, Nara Botku, *Tel.*
Eriochlæna tilifolia
Eriobotra Japonica.
Erythrina Indica.
Euphorbia tirucalli, Munchee jamudu, *Tel.*
Eugenia pulchella, Khway-tha-byai, *Burm.*
Eugenia myrtifolia, Tha-bai-jeen, *Burm.*
Eugenia caryophyllifolium.
Eugenia mallaccensis.
Eugenia jambolona.
Eugenia nervosa.
Eugenia ternifolia, Thab-yew-tha-byai, *Burm.*
Eugenia pulchella.
Eugenia racemosa.
Eugenia vulgaris, Thab-yai-tha-pan, *Burm.*
Eugenia salicifolia
Eugenia laurina. Wall-boam-boo, *Cyng.*
Execaria agallocha, Agallocha wood.

Fagrœa fragrans. A-nan, also Anan-Beng. *Burm.*
Feronia elephantum, Vella marum. *Tam.* H-man, *Burm.*
Ficus cordifolia. Nyoung-gyat, *Burm.*
Ficus indica. Banyan Tree. Bar-ka-jhar, *Hind. Tam.* Marree, *Tel.*
Flacourtia sapida. Kanuregu, *Tel.*
Flacourtia montana. Sampga, *Can.* Tambut. also Hudkee.

Garcinia Cowa.
Garcinia purpurea, Moorghul mara, *Can.* Kokum, *Mahr.*
Gardenia gummifera, Chitla matta. *Tel.*
Gardenia latifolia, Peda karinga, *Tel.*
Gardenia lucida. Garinda, also Tella Manga, *Tel.*
Gardenia, *Species.* Telega, *Tel.*
Geloxium bifarium, Hsai-than-bayah, *Burm.*
Gmelinia arborea, Coommy marum, *Tam.* Ky-oon-boe, *Burm* Goomar tek, *Tel.*
Gordonia floribunda, Theet-ya, *Burm.*
Gordonia integrifolia.
Guaiacum officinale, *Tam.*
Guatteria longifolia.
Guettardia speciosa,
Grewia floribunda. Myat ya, *Burm.*
Grewia Hookerii. Phet-woon, *Burm.*
Grewia Rothii, Jana, *Tel.*
Grewia spectablis, Phet woon, *Burm.*
Grewia tiliæfolia, Tharra, *Tel.*
Grewia paniculata, Hunu kirille, *Cyng.*
Gyrocarpus Jacquini, Poonkee, *Tel.*
Givotia Rottleriformis, Tella poonkee, *Tel.*

Hæmatoxylon campechianum. Logwood.
Hardwickia binata. Nar yepa, *Tel.*
Heritiera fomes : Soondree.
Heritiera litoralis, Kana zoe, *Burm.*
Heritiera minor, Soondree, *Hind.* Kana-zoe, *Burm.*
Hibiscus macrophylla.
Hibiscus tiliœfolia, Belygobel, *Cyng.*
Holugarna longifolia, Holgen, *Can.*
Hopea odorata. Then-gan, also Then-gan-pha-yung, *Burm.*
Hopea floribunda. Than-the-ya, *Burm.*
Hymenodictyon excelsum, Dudippa also chetippa, *Tel.*

Indigofera, *Species.* Doun-Daloon, *Burm.*
Illecebrum latrum, Nerrelloo, *Cyng.*
Inga dulcis, Coorkapooli marum, *Tam.*
Inga xylocarpa, Iron wood of Pegu, Py-in-ka-doe, *Burm.* Boja also Konda Tangadu, *Tel.*
Inga bijemina, Tau-yew, *Burm.*
Ixora parviflora, Koree, also Koravee Pal. *Tel.*

Jonesia asoca. Deree-ratem-bela, *Cyng.*
Juglans tricocca. Ta-soung-let-wah. *Burm.*
Juniperus excelsa, Cedar of the Himalayas.

Kydia calycinia. Boke-mai-za, *Burm.*

Lagerstræmia microcarpa.
Lagerstræmia reginæ, Jarool. *Hind.* Murute, *Cyng.*
Lagerstræmia Pymmah. Pymmah, *Burm.*
Lagerstræmia parviflora, Chinna ngee, *Tel.*
Laurus camphora, camphor-wood,
Laurus (sassafras). Hman-Then, *Burm.*
Lawsonia inermis. Marooithanay marum, *Tam.* Dan. *Burm.*
Limonia acidissima. Torelaga, *Tel.*

Maba buxifolia, Nulla muddee, *Tel.*
Mangifera attenuata, Taw-sa-tha-yeet, *Burm.*
Mangifera Indica, Maah marum, *Tam.* Tha-yet, *Burm.* Mango tree, *Eng.* Mamadi, *Tel.*
Melanorrhœa usitata, Varnish tree, *Eng.* Ma-yan, also Theet-see, *Burm.*

Melia azadirachta,' Malay Vaimboo, *Tam.* Persian Lilac; Pride of China; Pride of India, Bead tree, *Eng.*

Melicocca trijuga, Jo-bin, *Burm.*

Memecylon tinctorium, Surpa, *Mahr.* Iron wood of Canara.

Mesua ferrea, Singalese Iron wood tree, *Eng.* Naga keshura, *Burm.* Naw, *Cyng.*

Metrosideros vera, Iron wood of China.

Michelia Rheedii, Sumpanghy marum, *Tam.*

Michelia champa, Sappoo, *Cyng.*

Millingtonia simplicifolia.

Mimosa polystachia.

Mimusops elengi, Maghudam marum, *Tam.* also Kha-ya-gang, *Burm.* Moone mal, *Cyng.*

Mimusops hexandra. Paloo, *Cyng.*

Morinda citrifolia, Noanay marum, *Tam.* Nyaugyee, *Burm.*

Morinda bracteata, Yai-yoe. *Burm.*

Morinda excerta, Nyau also Mhan-bin, *Burm.* Togaree Mogillee also Mogillee, *Tel.*

Murraya.

Myristica amygdalina, Toung-sag-ga, *Burm.*

Myristica sphærocarpa, Kywai-thwæ, *Burm.*

Myrsine capitellata.

Nauclea cadamba, Vella cadamba, *Tam.* Maoo, *Burm.*

Nauclea cordifolia, Munja cadamba, *Tam.* Puspoo carambe also Bundaroo, *Tel.*

Nauclea orientalis, Kuta murra, *Can.* Kudum, *Mahr.*

Nauclea parviflora, *Helembe, Cyng.*

Nerium andysentericum.

Nerium tinctorium.

Nepheleum, *species* gal morre, *Cyng.*

Nyctanthes arbor tristis. Tree of Mourning. Hseik-ba-la, *Burm.* kar-cheea, *Tel.*

Odina wodier, Oodaya marum. *Tam.* Dumparee, also Goompinee, *Tel.*

Olax zeylanica, Melle, *Cyng.*

Parkia biglobosa,

Pentapterus alata, Kendul, *Can.* Kinjul, *Mahr.*

Pentapterus arjuan, Touk-kyan, *Burm.*

Pentapterus coriacea, Mairtee, *Can.* Aeen, *Mahr.*

Pentapterus glabra, Touk-kyan, *Burm.*

Pentapterus tomentosa.

Photinia serratifolia.

Pierardia sapota, Kana-yoe, *Burm.*

Pinus dammara of Tavoy.

Pinus Latteri, Hten-roo, *Burm.*

Pinus longifolia, of Nepal.

Pinus Webbiana of Nepal.

Poinciana elata.

Poinciana regia.

Pongamia atropurpurea, Lagun, *Malay*, of Martaban.

Pongamia glabra, Poonga marum, *Tam.* Karung. *Cyng.* Kanigu, *Tel.*

Premna hircina, chika gambhari, of Goalpara.

Premna tomentosa, Kolcuttay Teak, *Tam.* Naoc ru also Nagool, *Tel.*

Prosopis spicigera, Parumbay, *Tam.*

Psidium pyriferum, Coaya marum, *Tam.* Ma-la ka, *Burm.* Guava Tree, *Eng.* Jam k jhar, *Hind.*

Psidium pomiferum, Coaya marum, *Tam.* Ma-la ka, *Burm.* Guava Tree, *Eng.* Jam k. jhar, *Hind.*

Pterocarpus dalbergioides.

Pterocarpus indicus, "Pa-douk." Toung kha yai, *Burm.*

Pterocarpus marsupium, Vengay marum, *Tam* Yeggee, *Tel.*

Pterocarpus santalinus, Sevapoo Sandanum, *Tam* Chandum, *Tel.* Red sanders wood *Eng.*

Pterocarpus Wallichii.

Pterospermum, Indicum "Kyabooea."

Pterospermum aceroides, Tha-ma-jam-wai-zoke. *Burm.*

Pterospermum acerifolium, Na-jee, *Burm.*

Pterospermum subacerifolium, Na-jee, *Burm.*

Pterospermum ruberifolium, Velengee, *Cyng.*

Putranjiva Roxburghii.

Pygium acuminatum.

Quercus-Oak, many species. Tha-heik, also Thae-gha, *Burm.*

Quercus amherstiana.

Quercus Tirbbæ.

Quercus fenestrata.

Quercus lanceæfolia.

Quercus semecarpifolia Ghese eusroo.

Randea, *species.* Nulla mauga, *Tel.*

Rhododendron arboreum.

Rhus disipium, Pehim-bive, *Cyng.*

Rhyzophora decandra.

Rhyzophora gymnorrhiza. Pyu, *Burm.* Mangrove.

Ricinus dicoca. Taw-the-din-bin, *Burm.*

Rondeletea tinctoria. Tama-yoke, *Burm.*

Rottlera tetracocca. Kioun-la, *Burm.*

Rottlera tinctoria, Kioun-la, *Burm.*

Salmalia malabarica, Poola marum, *Tam.*

Sandoricum indicum, Theet-to, *Burm.*

Sapindus acuminata.

Santalum album, Shandanum marum, *Tam.* Sanda-koo, *Burm.*

Sapindus emarginatus, Poocheeeotay marum, *Tam.* Hseik-khyae, *Burm.* Kankadu, *Tel.*

Sapindus rubiginosa, Hseik-khyæ, *Burm.*

Sapota elegenoides.

Scytalea longa.

Scytalea trijuga.

Semecarpus anacardium, Chai-bin, *Burm.*

Sethia indica, Dewi-daree, *Tel.*

Schleichera trijuga, Kyet-monk, *Burm.* Pooskn, *Tel.*

Schrebera swietenoides, Makkam, *Tel.*

Sclerostylis atalantoides, Arawee neem, *Tel.*

Shorea (Vatica) robusta.

Sibia glomerata, Thit-phyew, *Burm.*

Simonia citrifolia, Pamburoo, *Cyng.*

Sonneratia acida, Ta bu, *Burm.*

Sonneratia apetala, Kam-ba-la, *Burm.*

Sophora robusta.

Spoonia ? Tellakaka mushtee, *Tel.* appears to be the Celtis Wightii of Wight's Icones.

Soymida febrifuga, Shem marum or Shourkullic marum, *Tam.* Soomee, *Tel.*

Spathodea longifolia, Daanga, *Cyng.*

Spathodea Roxburghii, Burray kala goru; *Tel.* *Hind.*

Sterculia fœtida, Peenary marum, *Tam.* Let-khoke, *Burm*, Telemboo, *Cyng.*

Sterculia guttata.

Stereospermum chelonoides.

Stereospermum suaveolens, Padrie marum. *Tam.*

Strychnos nux vomica, Yetti marum, *Tam.* Poison-nut, *Eng.* Kha-boung. *Burm* Mushtee or Musadee, *Tel.*

Strychnos potatorum, Taita marum. *Tam.* Clearing-nut, *Eng.* Chilla, *Tel.*

Stylocoryne Webera, Komee *Tel.*

Swietenia chickrassia, Nga-bai, *Burm.*

Swietenia chloroxylon. Shodawah porsh. *Tam.* Bilugu, *Tel.* Satin-wood.

Swietenia mahogani, Mahogany marum *Tam.* Mahogany Tree.

Syndesmus tavoyana. Kee-tha, *Burm.*

Syzygium jambolanum, Nawel marum, *Tam.* Nerar, *Tel.*

Symplocos floribunda, of Nepal.

Tamarindus indica, Poolia marum, *Tam.* Chinta, *Tel.* Amlee ka Jhar, *Hind.* Tamarind Tree.

Tamarix. Tamarisk.

Taxus virgata, Dheyn also Lolsi of Nepal.

Tectona grandis, Teak marum, *Tam.* Ky.won, *Burm.* Tek, *Tel.* Teak-tree. Sagwan ka Jhar, *Hind.*

Tectona Hamiltonii.

Tectona ternifolia, Ta-Hat, *Burm.*

Terminalia alata. Marudum marum. *Tam.*

Terminalia belerica, Cattoo eloopæ marum. *Tam.* Bau-kha, also Pan-gah, *Burm.* Thaudee, *Tel.*

Terminalia Berryi, Vella murda marum, *Tam.*

Terminalia citrina.

Terminalia catappa, Natvadom cottay, *Tam.* Badama, *Tel.*

Terminalia chebula, Pillay murda or kadookou, *Tam.* Kya-zoo, also ka-yoo-bin, *Burm.* Karaka, *Tel.*

Terminalia coriacea, Nulla maddie, *Tel.*

Terminalia glabra, Curry murda marum, *Tam.* Tella maddie, *Tel.*

Terminalia tomentosa, Nalla maddee, *Tel.*

Terminalia violata, Lai-bwai, *Burm.*

Ternstrœmia of Tavoy, Puzzeen zina, *Burm.*

Thespesia populnea, Poorsungkai marum, *Tam.*

Ulmus alternifolius, Tha-lai, *Burm.*

Ulmus integrifolius, Tha-la, *Burm.* Namillee also. Nowlee. *Tel.*

Uvaria tomentosa, Peda chilka dudugu, *Tel.*

Vachellia Farnesiana.

Vateria lanceolata.

Vateria lanceæfolia.

Vateria indica, Pynie, *Tam.* Hal, *Cyng.* Pynee Tree. *Eng.*

Visenia umbellata.

Vitex altissima,

Vitex arborea, Htouk-shah, *Burm.* Nowlee eragoo, *Tel.*

Vitex trifoliata, Caha milile ; Meean Milile and Sapoo milile, *Cyng.*

Vitmannia trifoliata. Samedera. *Cyng.*

Webera cerifera, Tarrene, *Cyng.*

Walsura piscoidea : Joebae, *Burm.*

Wrightia coccinea.

Wrightia antidysenterica, Veppaula marum, *Tam.*

Wrightia tinctoria, Palay marum, *Tam.* Tedla pal, *Tel.*

Xanthophyllum, *Species*, of Martaban. Sa-phew-Choo-moo-na. *Burm.*

Xylocarpus, *Species* : Keanuan of Tavoy.

Zalacea edulis.

Zizyphus glabrata.

Zizyphus jujuba, Yellanday marum, *Tam.* Hyzee, *Burm.* Renga, *Tel.*

The trees enumerated above belong principally to the following Natural Orders of plants, viz :

Alangieæ.
Anonaceæ.
Apocynaceæ.
Areceæ.
Aurantiaceæ.
Bignoniaceæ.
Bombaceæ.
Borasseæ.
Byttneriaceæ.
Cedrelaceæ.
Cocoeæ.
Combretaceæ.
Cordiaceæ.
Dilleniaceæ.
Dipterocarpeæ.
Ericaceæ.
Euphorbiaceæ.
Flacourtianeæ·
Guttiferæ.
Lauraceæ.
Leguminosæ.
Lepidocaryeæ.
Loganiaceæ.
Magnoliaceæ.
Malvaceæ.
Memecyleæ.
Moreæ.
Myrsineaceæ.
Myrtaceæ-
Olacineæ.
Rhizophoreæ.
Rosaceæ.
Rubiaceæ.
Salicarieæ.
Sapindaceæ.
Sapotaceæ.
Sterculiaceæ.
Styracaceæ.
Tamariscineæ.
Taxaceæ.
Terebinthaceæ.
Tiliaceæ.
Ulmaceæ,
Verbenaceæ.
Zanthoxylaceæ.

Dr. Roxburgh, who devoted great attention to the growth of timber trees, gives the following as the annual increasings of many of the trees above enumerated.

ON THE GROWTH OF TREES IN THE BOTANIC GARDEN AT CALCUTTA, IN BENGAL.

Table of the average Circumference of several of each Sort of the Trees mentioned on the Margin, in Inches and Quarters, taken four Feet and a Half above Ground, at the end of Octobe when the Year's Growth may be reckoned over. The difference between the Numbers in the adjoining Columns gives the Year's Increase in the girth of each Sort.

Names of the Trees.	Synonyms.	Age (in Years) of the Trees measured (in 1803, 1804, 1807, 1808. 1809, 1810, 1811, 1812, and 1813).																													
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Achras Sapota,	From the West Indies,											23½	25½																		
Adansonia digitata,																							188	204		216	220	223			
Ailanthus excelsa. R,				24	29½	33	37	41½																							
Alangium hexapetalum,	S. Uukotha nieochaka									21																					
Aleuritis triloba,							28½	31				42	45	48½	51½	55															
Andrachne apetala R.,										32½	34	35½	36½	38	39																
Artocarpus integrifolia,	S. and T. Panasa —H. and B, Kantal	6																													
1. ——— Chaplastra. R.,	H. Chaplash									43	48	52	55½		60½																
Barringtonia acutangula. R.,	S. Eedjul.—H. and B. Hedjul									42	43	44																			
——— racemosa R.,											13																				
Bassia latifolia R.	S. Madhuca,—H. and B. Mahwa,																					37½	38½	40							
Bauhinia retusa R,	S.																							63		67					
——— parviflora	S. Vanaragah —T. Ariæ,													41		46															
Berrya ammonilla, R,	C. Ammonuilla,			9⅓	11¾	14½	15¾	17	18																						
Bignonia suberosa R,		12												61½	64½	67	69½														
——— Chelonoides.	Tam. Pori-padyryæ marum,						32½	35	37½	40	43																				
——— undulata R.						18½	19½		22½																						
——— suaveolens, R,	S. Patali,											34	37½																		
——— xylocarpa R,							20½	23																							
——— indica,	T. Pampena										29	30		32																	
2. Blighia sapida, Bot, Ann,					11	15¼																									
Bombax pentandrum,	From the West Indies,			22																											
3. Boswellia thurifera,	S, Salaci.—B. Loban.—E. Frankincens, or Olibanum tree				13	15½	17½	19½	21½																						
Briedelia spinosa,	T. Corra-murum.							39	41½		45																				
——— crenulata, R,	H. Cantra-jerrool							19	21¾	24¼	26½	28½																			
Bubroma Guazuma,	E. Bastard-cedar, from the West Indies,																							49	50	51	52	53			
Buchanana latifolia, R.	S. and B. Piyal.—Tam Maræda,							20	22	24																					
——— angustifolia, R,						13	14½	16	17	19																					
Butea frondosa,	S. Palosa.—H. Palash.—T. Maduga,																		40	43						50	51				
Careya arborea, R,	T. Cumbi						17	21	24½	27																					
——— spherica, R,												26½																			
Cassia sumatrana, R,		17½	23½			30	33	36½	38½	40½	43																				
——— Bacilus Gært,																															
——— nodosa,									38	41	44	47	49																		
——— marginata. R,						32½	34																								
Casuarina muricata, R,	In common garden mould,				20	22				37½	41	44½	48	51½																	
The same tree in a very sandy soil					26½				39	42½	46½	50	52½	55																	
Casuarina nodiflora,		3½	10																												
——— equisitifolia,					13	17	21	25																							
4. Cedrela Toona, R,	H. Toon, B. Poma,										32½	35		42			48	49	50¼	52	55	57½	60								
Cinchona thyrsifolia R.												36																			
5. Conocarpus latifolia, R,	T. Siri-maun,				12½	15½			23	26½	29	31½	33½																		
——— acuminata R	T. Paunch-maun,				15½	18	21½	25	28																						
Cordia latifolia R,	H. Burrah Lehsura.							31	33½	36	38	39																			
——— Myxa,	H. Lehsura,							33½	35	37¼	39																				
6. Dalbergia sissoo, R	H. and B. Sissoon.—S. Shirigshupa,	5	11½	14½	17½			36½	41½	46	49½	52½	56						70	75			88	92½	96⅓	100½	104	107			
——— emarginata, R,	Andaman Sisso.													25½	30			41½	42½	43½	44½	46	48								
——— Ougenensis, R.							12½	14½			19½	22	25	23	31	33															
——— paniculata, R,	T. Patscroo,					41½	45¾	50½	54½	58	61																				
——— frondosa, R,					26	30½	34½	38½			51																				
——— zeylanica, R,	C. Belloo-labbee						29½	33½	37	40	42½																				
——— robusta. R,	B. Crowey,	11																													
Dillenia augusta, R,		7																													
——— speciosa,	S. Bhevya.—H. and B. Chalta,											25	27½	29¼	30½	31½															
Diospyros Ebenum,	Ceylon ebony tree,			5	8½	10½	12¼	14	16																						
7. Dipterocarpus turbinatus,	H. and B. Suffet-Gurgoon.—E. Wood-oil tree,																			23	24	25	26								
Echites scholaris.	S. Septa-perna.—H and B. Shopt-porna,																												54	57	
Erythrina suberosa, R,	T. Mooni-maduga,										34	36	37½	38½	39½																
——— ovalifolia, R,	S. Parphoodra,											51	53	54½	56	58															
Euphorbia arborescens, R,										36	38																				
——— Ligularia, R,	H. and B. Moonosha shij,						26	28	28¼																						
Fagara Retsa, R,	T. Retsa-maun,								26½																						
Ficus indica Amsen, acad, 1, 27	S. Vata.—B. Ber.—E. Banyan tree,						45	53½	58½	65	72	79																			
One of the accessary roots of an old tree which reached the ground 12 years ago, and was then about as thick as a quill												45	47½	50	52	54															
Gardenia dumetorum,	T. Maaga										19	21	22½																		
——— longispina R,									18	19	20½																				
——— latifolia.	H. Papara—T. Caringua,							22	23																						
——— lucida, R,										24	26½	29																			
——— costata, R,										12	14	16																			
Garuga pinnata. R.	T. Garuga.—H. and B. Ioom,										36	43	49																		
Gmelina arborea R,	S. Gumbharee.—H. and B. Gumhar,			18½			28½	31	32	33	33½																				
Gnetum Gnemon,												7½																			
Gyrocarpus Jaquinii						28½	31½	32¼	33½	37																					

Names of the Trees.	Synonyms.	Age (in Years) of the Trees measured (in 1803, 1804, 1807, 1808, 1809, 1810, 1811, 1812 and 1813).																										
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Hardwickea binata, R, ...	Tam Acha-marum, ...						20	24	28	30½	33	36																
Heritieria minor, R, ...	H. and B. Shundree.																											
Hura crepitans, ...	From the West Indies							63	65	66	67	67¼																
Jonesia Asoca R, ...	S Asoca.—H. and B. Bussuck,...							22	23½	25																		
Kleinhovia hospita, ...	....												34															
8. Lagerstroemia Reginæ.	S. Arjuna.—H. Jarool, ...																		48½	53	——	——	——	——	71	74	77	79
——— ——— grandiflora R. ...	S. Indradroog, ...					30	34	38	——	46																		
——— ——— parviflora R, ...	T. Chinamghie, ...				27	31	36	39	41½	45																		
Laurus Cinnamomum	S. Darasity.—Dar-chini. H ,and B						16⅓	20½	24	28½																		
Melaleuca Cajuputi	E. Cajuputi-oil tree, ...									13½	15	17	18½	20														
Melia Azedarach	....					37½	44¾	46½	47	47½	49½																	
——— robusta, R, ...	....						44	49½	51¾	53½	56																	
——— superba. R.	....	10	17	29	38	44	50	58																				
Mimosa Shirisha R, ...	S. H. and B. Shirish, ...							29	31½	——	——	35	37	39														
9 ——— xylocarpa R, ...	T. Conda-tangherru.—Burm. Pingadow, ...						17	21	——	——	31½	34	36½	39	42	44½												
——— elata R	....									28	32½	——	——	——	50	55	59	64										
——— stipulata R, ...	H Amlooki							40	48½	——	——	63	74½	80	84½	89	95											
——— lucida, R, ...	....											49	56½	——	——	75	79½	83	88	93	97½							
——— dulcis. R.	....								59	64																		
——— Catechu.	S. Chadria, and Kudheer the Catecu, ...						22	25	27	28	29	30¼																
——— odoratissima, ...	T Shinduga. Tam. Sælæmarum, ...							34	37	40	43	46	50															
——— arabica, ...	S. Barbura.—H. and B. Babui, ...								34¼	37	41	44																
——— biglobosa, ...	R. Subatah, ...	3																										
—— —— pedunculata. R, ...	....	7	11¾	16			21	25	29	33	36½	——	42															
——— Suma, R.	S. Sami —B. Shain,...						37½	38½	39¾	41																		
——— leucophloea, ...	Tam Veel-velum, ...																											
Myristica aromatica, ...	E. Nutmeg tree, ...					3½	4½	{2½ f. ab. grd.		8½	10	10¾ 31¼	11¼	11¾	12½													
Nauclea parvifolia R.	T. Botu-Cadami, ...																											
——— stipulata, R, ...	....				11	13½	——	——	19½	21																		
10. —— macrophylla, R, ...	....	8	15¾	——	——	29	33	36	38¾	40½	43																	
——— cordata, R, ...	....						21½																					
—— cordifolia, R, ...	T. Dadnga – H. and B. Keli-Codom...						22	25	——	——	——	36	38															
Nerium tinctorium. R, ...	T. Tshit-aukaloo...													36½	39½	43¼	46½	49	52									
Ochroma Lagopus, ...	From the West Indies, ...							32	36½	39½	42	45½																
Pentaptera paniculata, R, ...	Tam. Pæ-Sarakai.—T. Nimmeeri, ...							18	22																			
——— Arjuna. R, ...	S. Cocubah, ...							32	35½	38	40½	42																
11. ——— tomentosa, R.	S. Asana.—H. and B. Assan, ...														37	38					43½	44½	45½	47				
——— crenulata, R, ...	....						23	26	28	30	31¾																	
——— bialata, R, ...	....																	51	53½	——	——	62	64	66	68½	71	73	
——— angustifolia. R. ...	....							32	35½	38	40½																	
Prosopis spicigera	S. Sami.—T Tshami.											27																
Pterocarpus marsupium. R, ...	H. Peet-sbal.—T. Yeangazhan, ...											23	26	——	——	——	——	40	42	43½	45	46½						
——— dalbergioides R, ...	Andaman red-wood,...									27	29½	——	——	38½	43	46½	49½	52½	55¼									
——— The same in more favourable soil	....													48	51								57	60	63	65½	68	70
Pterospermum acerifolium, ...	S. Kornikara.—H. and B. Conoc-champa, ...																											
Ricinus mappa	....												31½	32¼								78	80	83	85½	88	91	
Rottleria tinctoria. R, ...	S. and B. Poonag, ...										25	26	27½															
Sandoricum indicum	Mn. Sandoricum, ...																											
Santalum album	Sandul-wood.—S. Chandana, ...									27	29	30½	32½	34	35¼													
Sapindus saponaria	From the West Indies, ...					20	25																					
——— laurifolius	....								31½	34½																		
Sapium sebiferum	Talloo tree of China, ...															60	61¾	62¼	——	65½								
Semecarpus Anacardium ...	H. and Ba Bhella-toki, ...									32	34½	37½	40½	43	47													
12. Shorea robusta R, ...	S. Sala. B. Shal-chucna, ...											14¼	16¼															
Spondias dulcis	Otaheete apple					30	32	34½	38	41	45																	
——— mangifera	S. Amarataca.—H. and B. Amara, ...																	50	52½	55	57							
Sterculia alata, R, ...	B. Toolah						21	24½	27¼	31																		
——— guttata R	See, Hortus malabaricus, 44,61, ...																											
——— villosa, R, ...	....							25	27½	——	——	32	34¼	37½	39	41												
——— colorata, R, ...	T. Karaka									30½	33½	37	40															
——— fetida	....									23¾																		
Strychnos Nuxvomica	S. Culaca H. Cuchila							20	22	24½	26	27½	30															
13. Swietenia Mahogoni	Mahogany from the West Indies						25½	30¼	——	——	41	44	47	50	54													
——— Chickrassa. R.	H. and B. Chickrassy								25	28	——	——	37½	39½	41½	——	44	46½										
——— febrifuga. R.	T. Soymida.—H. Rohina.—Tam Woonæ-marum ...								21½	24½	——	——	——	37¼	40⅓	43	45½	47	49									
——— chloroxylon. R.	T. Billoo.—E. Satin-wood						18¾	21½	23¾	24½	26½																	
Tamarindus indica	S. Amlica.—H. and B. Amli																		46½	49½	52	54	56					
Tamarix indica	S. Ihaveeka.—H.and B. Ihau													48	50	52	53	——	60									
Tectona grandis	H. and B. Shegun.—T. Teek.—Can. Ianddy.—Mn. Jatus		7	10					18½	21½						42½	44¼	——	——	50	52	54	55½	57½				
The same in a more favourable soil	....									42					54½	58¾												
Terminalia procera. R, ...	From the Andaman Islands					25½			23	25	——	——	32	34	36	37½	39	40										
——— Catappa, ...	H. Badam			15						30	32½	——	——	40	43	46	48½	50	51½									
14. ——— Chebula, ...	S. and B. Hari taka.—H. Har.—A Athliej				21	25	29	32																				
15. ——— Bellerica	H. and B. Bohera.—P. Beleleh									20	23¼	——	—	31½	34	36	38½	40¾										
Ulmus integrifolia, R , ...	....									34																		
Uvaria odorata	Mn. Cananga				14	19	——	——	29	31½	34	36	37½	39½														
——— longifolia, ...	S. Deva-darce.—H. Debdar				8½	10¾	13	15	16½	18½																		
Vitex leucoxylon, ...	....											29½	31	33														
— alata, R, ...	H. Asula											30	31	32														
Xanthocymus pictorius R, ...	B. Deuphol																								26			
——— dulcis R....	....													8½														

Note 1. When one or more columns intervene in the same line, without being joined by a line of ink, the measurements to the right and left of the vacancy were not taken from the same trees; but when joined, they are the same and bear a reference to each other, as well as when no vacant column comes between.

Note 2. In the column of Synonyms S. means Sanscrit,—H. Hindustanee,—B. Bengalee,—T. Telinga,—Tam. Tamul,—C. Cingalese.—Can. Canara,—Mn. Malayan,—A. Arabic,—P. Persian,—E. English,—Burm. the Burma Language, and R. after the Trivial (or Specific) name implies all such as appear new to Dr. R., and that such Trivial names have been given by him.

W, ROXBURGH.

1875

TIMBER AND FANCY-WOODS OF EASTERN AND SOUTHERN ASIA.

Dr. Wallich is the only other author we shall quote on the subject of the woods of Asia gen rally, and we give his Catalogue here as furnishing places of growth, the weight per cubic foo and specific gravity of the principal of the woods of which we have already given the list.

	NAME.	Place of growth.	Weight per cubic foot.		Specific gravity	REMARKS.
			lbs.	oz.		
1	Acacia—? (Popecah),	Tavoy,	23	3	.371	A large tree; wood used house-building, &c.
2	,, ,,	do.	23	3	.371	A very large tree; wo used for posts, bows, an rollers and for cotton gin
3	Ægle marmelos (Bellee),	Ceylon, India,	49	1	.784	
4	Anacardium latifolium (Bhela),	Gualpara,	37	0	.592	Used for making chests an couches.
5	Andrachne apetala,	India,	33	14	.542	
6	Artocarpus chaplasha,	India,	34	12	.556	
7	Artocarpus hirsuta (Angellywood),	Cochin,	36	14	.590	Used in ship-building.
8	Artocarpus integrifolia (Jackwood)	Travancore,	35	10	.570	
9	Artocarpus—? (Pynyathe Tanabeng)	Tavoy,				
10	Aultoovanchee,	Travancore,	31	6	.502	
11	Anyanny,	do.	32	11	.523	
12	Averrhoa carambola,	India,	39	11	.635	
13	Bah-nah-thoa	Tavoy,	……		……	Used in boat and house buildings.
14	Betula Bhojpattra,	Nepal,	35	5	.565	Wood moderately hard, compact.
15	Bignonia chelonoides,	Nepal.	42	8	.680	A large tree.
16	Bignonia—? (Tathee),	Tavoy,	49	8	.792	A very large tree.
17	Bignonia (Thuggainee),	Tavoy,	40	4	.644	A large tree, used in house building.
18	Cadooca Marum,	Travancore,	38	3	.611	
19	Calophyllum—? (Thurappe : ehopee),	Martaban	43	0	.688	Used for masts and spa and for pestles to oi presses.
20	Cambagum,	Travancore,	28	11	.459	
21	Canoo,		36	0	.576	
22	Cannal	Travancore,	47	6	.758	
23	Caunao,	do.	58	7	.935	
24	Caragagaloo,	do.	33	0	.528	
25	Carapa—? (Tai-la-oon),	Tavoy,	36	0	.576	Used in house-building.
26	Careya—? (Kaza),	Martaban,	46	0	.736	Timber of large size, used for posts, &c.
27	Careya (Kombo),	Gualpara,	42	12	.684	Wood hard and strong; used for the stocks o matchlocks.
28	Caringosba,	Travancore	45	5	.725	
29	Carivagah,	do.	33	10	.538	
30	Caroogha,	do.	44	10	.714	
31	Caroo Marum,	do.	47	11	.763	
32	Carintha,	do.	34	4	.548	
33	Cassia,	India,	41	9	.661	
34	Castanea indica,	India,	39	0	.624	
35	Castanea tribuloides (Cotoor; chisee, Makoo; shingali),	Nepal,	62	0	.992	Used for large mortars and pestles for grinding corn.
36	Catunguin,	Manilla,	42	11	.683	Used in ship-building.
37	Caultoo mooroonga,	Travancore,	45	14	.734	

NAME.	Place of growth.	Weight per cubic foot.		Specific gravity.	REMARKS.
		lb.	oz.		
38 Cedar,	India,	25	2	.402	
39 Cedrela Toona (Toon, Tunga, Poma Jeea)	Gualpara,	36	0	.576	Wood very durable, and much used for furniture.
40 Cedrela Toona (Toon, Tunga, Poma Jeea),	India,	32	9	.521	
41 Chambagum,	Travancore,	37	11	.603	
42 Chana,	do.	20	7	.327	
43 Chinchona gratissima (Tungnusi)	Nepal	23	0	.368	Used for posts and rafters.
44 Chorangaree,	Travancore,	29	11	.475	
45 Cæsalpinea sapan (sappan),	do.	60	14	.974	Used for dyeing and sometimes by the turner.
46 Coombool,	Travancore	31	14	.510	
47 Coturnba,	Ceylon,	23	5	.373	Occasionally used in house building in Ceylon, but not esteemed.
48 Cou-moo	Tavoy,	....		....	Used in boat and house-building.
49 Cynometra polyandra	India,	52	10	.842	
50 Cynometra—? (Maingya),	Martaban.,	48	7	.775	A small tree.
51 Dalbergia lanceolaria (Neddoon, Neddum, Nander-wood	Ceylon,	45	7	.727	Used and valued for house-building in Ceylon.
52 Dalbergia latifolia (East India ebony)	India,	66	8	1064	
53 Debool,	Ceylon,	38	3	.615	
54 Diospyros melanoxylon (black ebony)	...	61	2	.978	Used for turnery work, and for inlaying.
55 Diospyros racemosa	India,	34	11	.555	
56 Diospyros—? (Ryamucha choomullo)	Martaban,	50	3	.803	Used in house-building.
57 Dipterocarpus—? (Kunneanphew, ..	Tavoy,	25	3	.403	Grows to a great size; used for beams and planks.
58 Domba,	Ceylon,	33	3	.531	Used for the outriggers of canoes.
59 Dombeya melanoxylon (St. Helena-ebony).	St. Helena,	71	9	1.145	
60 East India ebony. See Dalbergia.					
61 East India rosewood,	India				
62 Ehretia lœvis,	Botanic Garden, Calcutta.				
63 Ekebergia—? (Jiyakohi)	Gualpara,	39	1	.625	
64 Eleocarpus serratus (Weraloo),	Ceylon,	33	8	.536	
65 Eribotrya japonica (Loquat)	India,	46	11	.747	
66 Eugenia malaccensis (Jamboo),	Ceylon,	30	4	.484	
67 Eugenia malaccensis (Jamboo)	Ceylon	30	14	.494	
68 Execœcaria	Tavoy,				
69 Fagrœa fragrans (Annah beng, Burm..	Martaban.	52	8	.840	Timber large compact, very hard.
70 Ficus—? (Thubboo)	Tavoy,	21	0	.336	Used in house carpentry.
71 Gadeboo	Ceylon	21	3	.339	Used for making charcoal for gunpowder.
72 Galloopah	Travancore,	53	0	.848	
73 Garcinia—? (Pullowa)	Tavoy	45	8	.728	A large tree, used for posts.
74 Garcinia—? (Purrah wah)	do.	45	8	.726	A strong durable wood.
75 Gmelina arborea	India,	32	3	.515	
76 do. do.	do.	32	6	.516	
77 Go-na	Ceylon,	24	8	.392	
78 Gordonia—? (kaza)	Martaban..	37	10	.602	Large timber, used for ordinary building purposes.
79 Guacua	India	41	14	.670	
80 ...	...				
81 Gundruey	India,	34	15	.559	Wood with a peculiar odour resembling that of aniseed.
82 Heriticra—? (Soondree)	India,	57	15	.927	Used in ship-building.
” ” ”	do.	49	15	.799	

NAME.	Place of growth	Weight per cubic foot.		Specific gravity.	REMARKS.
		lb.	oz.		
83 Hibiscus macrophyllus	Tavoy	27	13	.445	A middle-sized tree, used for common building purposes.
84 Hibiscus macrophyllus	do.	28	0	.448	
85 Hibiscus	Tavoy,	,,		,,	Used for common building purposes; the bark is made into cordage.
86 Hopea floribunda (Tantheya)	do.	27	11	.443	A very large tree.
87 Hopea odorata (Tengaun, Thacu gong)	Martaban,	38	0	.608	Canoes are made of this tree which produces a valuable resin.
88 do. do. do.	Tenasserim Coast	40	12	.652	Used in boat building, grows to a large size, and is abundant.
89 Hune,	Burmah,				
90 Indian Wood,	do.	45	6	.726	
91 Jeeah,	India,	36	11	.587	
92 Juglans pterococca,	India,	39	14	.638	
93 Juniperus excelsa (cedar of Himalaya.		34	7	.551	An excellent light wood.
94 Kaantha,	Tavoy,				Small but valuable timber.
95 Kain-tha-phogee. See Symplocos,					
96 Kaunzo-kurro,	Tavoy,	43	0	.688	Used in boat-building.
97 Kaza. See Careya also Gordonia,					
98 Keahnaun	Tavoy,				
99 Keaza Perroun,	Tavoy,				Used in house building.
100 Kuddoot-alain,	Tavoy,	53	3	.851	Grows to a great size; used in house-building.
101 Kuddoot-nee,	Tavoy,	34	0	.554	An inferior wood; used in boat building.
do. do.	do.	34	3	.547	
102 Kunneen-keunkee. See Bignonia,	do.				
103 Kunneen-keunla. See Symplocos,	do.				
104 Lagerstrœmia reginæ,	India,	46	8	.744	
105 Lagerstrœmia—? (kuenmounec; Peema)	Tavoy,	37	9	.601	
106 Laurus camphora? (Camphor wood,)	China,	35	14	.574	A wood emitting an agreeable aromatic odour,
107					
108 Laurus—? (Kayzai)	Tavoy,	43	3	.691	Used in house carpentry.
109 Laurus—? (Kullowa also kurrowa)		30	0	.480	Produces the sassafras bark
110 do. do.	do.	30	0	.480	Camphor wood of Martaban.
111 Laurus—? (Lumpatch, Chasepoo),	Nepal,	34	0	.544	Used in carpenter's work, and for beams.
112 Laurus—? (Panatha,)	Tavoy,	43	0	.688	Used in house carpentry.
113 Laurus—? (Sassafras),	India,	32	12	.524	
114 Laurus—? (Thuggoo),	Tavoy,				Used for oars and rudders.
115 Manga chapui,	Manilla,	41	15	.671	Used in ship.building.
116 Maroothee,	Travancore,	37	7	.599	
117 Maunthaen or Sassafras,	Tavoy,	36	10	.586	Used in making house furniture.
118 Maymaka,	India.	51	12	.828	Used for timber of junks.
119 May-rang,	Tavoy,	48	9	.777	Said to be very durable; used for the posts of houses on the banks of rivers.
120 Megeongce	Tavoy,	38	16	.617	A very large tree used in house-building.
121 Melia Azadirachta,	India,	46	1	.739	
122 Metrosideros vera (iron wood),	China,	53	0	.848	Used for anchors by the Chinese.
123 Mimosa odoratissima,	India,	45	6	.726	
124 Mimosa polystachya	Botanic Garden Calcutta,	32	0	.512	
125 Mimusops Elengi,	Tavoy,	46	0	.736	A slow growing tree.

NAME.	Place of growth.	Weight per cubic foot.		Specific gravity.	REMARKS.
		lb.	oz.		
126 Moluve or Moloba,	Manilla,	51	3	.819	Used in ship-building.
127 Moonga Vallah,	Travancore,	38	5	.613	
128 Mootoocorandy,	do.	38	13	.621	
129 Morinda citrifolia,	Botanic Garden, Calcutta	28	10	.458	The root yields a red dye
120 Morung saul. See Shorea,					
131 Munha cadamboo,	Travancore,	38	15	.623	
132 Murraya—? (Maikay),	India,	60	12	.973	A strong tough wood.
133 Myrsine capitellata	Nepal	21	11	.349	Said to be compact and hard.
134 Nar, or sacred wood	Ceylon	55	0	.880	Used by the natives for building temples and royal palaces, an excellent wood.
135 Neerovalum	Travancore.	24	5	.389	
136 Nellee	Ceylon	34	8	.552	
137 Netty, or Nelly	Travancore	42	5	.677	
138 Nerium tinctorium	India	39	14	.638	
139 Nun Poungoo	Travancore	56	15	.611	
140 Odina Wodier	India	41	0	.656	
141 Osyris peltata (Phaoun)	Tavoy	29	10	.474	
142 do. do.	India	30	8	.488	
143 Pah-doubh		60	0	.960	
144 Palah	Travancore	14	9	.230	
145 Palai	Borneo	23	13	.381	Used in the construction of canoes.
146 Palm	India	57	9	.921	
147 Palmist	do.	62	7	.929	The wood of one of the palms used for cabinet and marqueterie work.
148 Panacha	Travancore	44	14	.718	
149 Pen lay oun		32	0	.512	Affords good crooked timber
150 Penlaly peen,	Tavoy,				
151 Peroomarum,	Travancore,	27	14	.446	
152 Pienmahne,	Tavoy,				
153 Pienmah-pue,	do				
154 Pierardia? (kunna, also kuzzo)	do	37	12	.604	
155 Pinus dammara,	do	39	0	.627	
156 Pinus longifolia,	Nepal,				Excellent timber.
157 Pinus Webbiana,		21	0	.336	
158 Poomaram.	Travancore,	29	8	.472	
169 Poomdroo,	do	40	13	.653	
160 Poonah,	do	50	15	.815	
161 Pothiree,	Travancore,	35	4	.564	
162 Premma hircina (chikagambhari)	Gualpara,	43	0	.691	A strong odour like that emitted by the musk rat, is given out by this wood. Used for musical instruments.
163 Psidium pomiferum (Guava)	Travancore,	44	3	.704	
164 Pterocarpus santalinus (Red Sanders)	India,	46	14	.750	
165 Pterocarpus? (Thounkheea)	Martaban,	51	9	.826	
166 Pterospermum indicum (Amboyna).	East India Islands.	39	10	.634	Much used for ornamental work
167 Quercus Amherstiana, Tirbbae, Ryakle	Martaban,	57	10	.922	Used for coarse furniture.
168 Quercus fenestrata,	India.	47	0	.752	
179 Quercus lanceaefolia,	,,	41	10	.666	
170 Quercus lappacca,	,,	51	4	.820	
171 Quercus semecarpifolia (Ghese cusroo)	Nepal	22	0	.352	Wood light, from a large tree
172 Regal wood,	Thibet,	54	6	.870	A very beautiful wood; much prized and used by persons of high rank only.
173 Rhizophora decandra,	India,	46	0	.736	
174 Rottlera? (kcounlae,)	Tavoy,	37	9	.601	A large tree; wood used for rudders, &c.
117 Sandoricum— ? (Thittoo,)	Tavoy,	28	6	.454	Used for furniture.

NAME.	Place of growth.	Weight per cubic foot.		Specific gravity.	REMARKS.
		lb.	oz.		
176 Santalum album,	India	47	13	.765	
177 Sapotea ? (Palaepcan),	Tavoy,	41	0	.656	A very large tree; wood used in building.
178 Scytalia longa,	India,	44	8	.712	
179 Scytalia trijuga,	India,	60	0	.960	
180 Scytalia—?,	do	39	6	.630	
181 Shorea robusta (Indian saul)	do	52	10	.842	A strong and durable wood; in great repute for ship-building.
182 (Morung saul),	Nepal,	43	14	.702	
183	do	45	14	.734	Much used in India for various purposes, where strength and durability are required.
184 Sonneratia ? (Thaumma)	Tavoy.	42	0	.672	A small tree.
185 Sophora robusta,	India	42	4	.676	
186 Sterculia ? (Kuneenee,	Tavoy,	.. ....		......	Tree of very large dimensions.
187 Swietenia chloroxylon (satin wood Booroota),	Ceylon,	51	0	.816	Used for furniture &c.
188 Swietenia febrifuga,	India,	54	14	.378	
189 Symplocos floribunda,	Nepal,	. ...		.... .	A large tree.
190 Symplocos ? (kaintha phogee),	Tavoy	34	7	.551	Affords good crooked timber.
191 Symplocos ? (kunneen keunkce, kunneen keuula),	do	34	4	.548	Used for beams, posts &c.
192 Syndesmis tavoyana (keetha),	do	....		......	Used in house building.
193 Tantheya,	Tavoy	44	0	.704	Grows to a large size timber strong and good.
194 Taxus virgata, (Dheyn also Lolsi)	Nepal				
195 Tectona grandis (Teak, Taaka, Tekka)	Ceylon	47	3	.755	One of the best of the Ceylon woods.
196 ,, ,, ,,	Travancore,	42	8	.680	A strong and durable wood; much valued for ship building
197 Tectona grandis (East Indian teak)	Malabar coast	37	14	.606	The best kind of teak.
198 ,, ,,	Moulmein.	31	9	.505	
199 ,, ,,	do	32	1	.513	This quality of teak is not so good as the Malabar.
200 Terminalia catappa	Botanic Garden, Calcutta	32	0	.480	A noble ornamental tree wood very good.
201 Terminalia chebula	India	42	10	.682	
202 Terminalia citrina	do.	60	2	.962	Very heavy and compact
293 Terminalia—? (Thaphanga	Tavoy	50	5	.805	
204 Ternstromia —? Puzzeinzwa	do	36	7	.783	A rather large tree, used for posts and rafters.
205 Tetranthera nitida	India	34	4	.548	
206 Teutha	Tavoy	54	0	.864	
207 Thallarwoo	Travancore	44	0	.704	
208 Thambuvoo	do	55	6	.886	
209 Thaun-bau po	Tavoy	....		......	An inferior light wood.
210 Thau-baunthawlay	do	....		.....	A strong durable wood, but does not saw kindly
211 Thoun-mynga,	Tavoy,	48	0	.768	Used in house building.
212 Thymboo,	Tavoy,	17	7	.279	A strong and durable light wood.
213 Thymboo, Thau-baunpo,	do.	17	3	.275	Strong durable light wood, used in boat building.
214 Town-pine,	do.	28	13	.461	Used in boat building and much esteemed.
215 Town-suggah,	do.	...		...	
216 Une,	do.	...		...	Affords good crooked timber used for boat building
217 Vallathorashel,	Travancore,	22	1	.353	
218 Vanava,	Manilla,	42	11	.683	Used in ship-building..

NAME.	Place of growth.	Weight per cubic foot.		Specific gravity.	REMARKS.
		lb.	oz.		
219 Vanneemooringa, ...	Travancore, ...	40	10	.650	
220 Vateria lanceæfolia, ...	India, ...	53	15	.863	
221 Vavoolagoo, ...	Travancore, ..	29	4	.468	
222 Vellilagoo,—	,,	28	8	.456	
223 Velty, or Vetty, ...	,,	40	11	.657	
224 Venga, ...	,,	47	1	.753	
225 Vinnec, ...	,,	15	8	.248	
226 Vinny marum, ...	Travancore. ...	11	3	.179	
227 Vyashanthak, ...	,,	41	0	.656	
228 White dammar lout, ...	India, ...				
229 Xanthophyllum—?(Sapheu,Choomuna)	Martaban, ...	33	10	.538	
230 Xylocarpus—? (Keannan,)... ...	Tavoy, ...	46	9	.745	Used for furniture and in house-building.
231 Zizyphus— ? (zeethee),... ...	India, ...	35	11	.571	

In our previous observations on Timber trees generally, we endeavoured to supply the names by which they are known to scientific men, but n much of the subsequent remarks attention will be directed to the woods of particular districts nd the local names by which they are known.

8193) *Timber from the province of Amherst, at the Great Exhibition of* 1851. See *Ill. Cat. Vol.* II, *p.* 885.

1 *Anan.* Used for constructing temples. It is a yellowish-white heavy durable wood.

2 *Ban-boay.* It is a strong and useful wood, a kind of Mimosa, employed as house posts.

3 *Ban-kha.* Used for house posts, and other common purposes. It is a peculiar kind of wood, colour grey.

4 *Bep-than.* Used for making handles for spears and sword ; it is a superior wood, nd looks like white Jarrool.

5 *Bhai-bya.* Used for house posts. White Jarrool.

6 *Bhyeng-tseng.* This is a closegrained, compact, grey wood, fit for general purposes, and seems to be exempt from attacks of insects.

7 *Bijion.* This is used for house posts, rafters, and the like purposes ; it is a heavy, compact, grey, close-grained wood.

8 *Daup-yat.* Employed for rafters ; it is a beautiful yellowish-white compact wood, but has a tendency to split. The leaves are used asa dye.

9 *Dien-neeung.* Used for rice-pounders ; t is a close-grained, strong, compact, brown, hard wood.

10 *Eng.* Wood used for boat-building, and produces oil. It is a strong, heavy, useful, grey wood, suited for beams, piles, and the like.

11 *Eng-gyeng.* Also used for posts of religious buildings. A useful wood, but subject o split.

12 *Gan-gan.* A very strong, tough, hard, crooked grained, fibrous, red wood, which would do for machinery or any purpose requiring the above properties.

13 *Gyo.* Used for house posts, ploughs, handspikes, &c.; it is a close-grained, compact, fine wood.

14 *Ka-theet-nee.* Employed for house posts, boats, and carts. It is a heavy, hard, grey wood, rather liable to injury from insects.

15 *Kha-boung.* A strong wood but small, as strong as oak. The fruit is said to be used for rubbing on buffaloes to keep off flies.

16 *Kiep-dep,* ditto, a kind of Saul.

17 *Kiep-maup.* Employed for cartwheel spokes. Superior wood, free from attacksof insects ; the tree is said to have an edible fruit.

18 *Kiep-yo.* A heavy, good wood, but small, used for house posts and rafters.

19 *Koup-ha.* This is a light, soft wood, not subject to injury from insects. It is probably Nauclea cadamba, and is employed for carved images.

20 *Kya-nan.* This is a most hard, close-grained, ebenaceous wood, of dark red colour ; used for house posts, musket-stocks, and pear-handles.

21 *Kya-zoo.* This is a very heavy wood, like Saul.

22 *Kyway-thoay.* Is a strong, solid wood, probably will prove to be a kind of Acacia. Used for house posts and rafters.

23 *Kywon.* A kind of Teak wood.

24 *Kywon-bo.* This is used for house-posts, rafters, and oars ; it is probably a sort of Teak.

25 *Kywon-gaung-noay.* A close, heavy, compact, tough, yellowish-white wood, of which house posts and rafters, &c. are made.

26 *Lammay* Used for house posts ; it

is a red, light, but useful timber, like sandal wood, and is free from attacks of insects.

27 *La-phyan.* A heavy, solid, large-sized timber, but rather liable to injury from a peculiar insect, not white ants.

28 *Lep-dwat.* Used for spear-handles and sword-sheaths; it is a fine grained, white wood, fit for turning purposes and picture-frames; it is probably the same kind of Nauclea which is used for similar purposes in Bengal.

29 *Lieun.* Used for house posts and rafters. It is a most valuable compact wood, homogeneous and very heavy, of deep-brown colour and fine grain, and also exempt from attacks of insects.

30 *Liep-yo.* Used for making carpenter's tools; it is a very compact and heavy, but small-sized timber.

31 *Mala-ka.* This is used for gunstocks and carpenter's tools; it is a close, compact, but small-sized wood, fit for hand-spikes, wheel-spokes, and the like.

32 *Ma-thloa.* Used for house posts; probably Artocarpus integrifolius, or jack-wood.

33 *Maza-neng* or *Maga-neng.* This is a close-grained wood, nearly allied to Teak. It is used for house posts, carts, boats, paddles, oars &c.

34 *Meet-gnyoo,* or *Neet-gnyoo.* Fruit tree. It is a red-coloured, useful, strong, heavy wood, probably a species of Mimosa.

35 *Meng-ba,* or *Ming-ba.* Used for house posts and rafters. The wood looks like a kind of saul, and would answer all the purposes of that wood.

36 *Moma-kha,* or *Morna–kha.* Employed for gunstocks; it is a reddish, softish wood, close and compact, fit for turning purposes, and exempt from attacks of insects.

37 *Mou-tha-ma.* Bark used for blue dye, a fine-grained, compact, red wood, but liable to split; it would answer for hand-spikes. It resembles Myrtus pimenta.

38 *Myaup-loaut.* Cedrela, a kind of superior Toon.

39 *Myaun-ngo.* White sissoo; used for rafters.

40 *Mya-ya.* Hard and close-grained wood, used for rafters; it is strong and durable, and would answer for beams, &c., being exempt from the attacks of insects.

41 *Na-kyeen.* Employed for house posts and rafters. This is the Soondrie wood of Calcutta, (Heritiera minor), where it is so common as to serve for fire-wood, although from its superior qualities for buggy-shafts, hackery or cart axles and wheels and other purposes requiring great strength and toughness, it is highly prized.

42 *Naoo.* Used for house posts: the leaves, flowers, and roots are said to be used for medicine. It is a brown, substantial, soli wood, not liable to the attacks of insects.

43 *Nga-soay.* This is a solid, very heavy, reddish wood, and answers for hous posts and rafters.

44 *Nyaung-lan.* Saul, "*Shorea,*" of peculiar kind, employed for beams, rafters, an boat building. The root is used as umbrell stocks.

45 *Oun-thnay.* A white soft wood, no subject to injury from insects; it is employ ed for common carpentry.

46 *Pad-dan.* Used for making drums an musical instruments. It is a kind of re Sanders wood.

47 *Pa-ngan.* Used for boats and oars it is a compact white wood, and is also in us for making musical instruments. It seems t be Gmelina arborea.

48 *Pa-ra-wa.* A hard, red, compact wood, with large fibre, and fit for gun-carriages or other similar purposes. It is exempt from attacks of insects. It is used for spears and arrows.

49 *Peng-lay-oun.* Used for spear handles; it is a most valuable wood, compact homogeneous, and very heavy, of a deep brown colour and fine grain, having no tendency to split, and being exempt from attacks of insects.

50 *Pinnai.* This is said to be a fruit tree; the wood affords a yellow dye, and is a compact, handsome, yellow wood, suitable for common cabinet purposes. It is probably an Artocarpus.

51 *Povin-gunyet.* Used for house posts and rafters. It is a kind of Jarrool, "*Lagerstræmia*" a good serviceable wood, and would do for piles, posts, and beams.

52 *Pyeen-ma.* House posts, carts, boats, paddles, oars, &c., are made from this, which is a capital wood, a kind of saul, and would answer for all the purposes of common Saul. Sp. Gr. 0·920.

53 *Raung-thmoo.* Used for house posts; it is a kind of Teak.

54 *Seet-seen.* Used for the construction of religious houses. It is a red, compact, very ponderous, and highly valuable wood.

55 *Tan-labet.* A heavy, white wood, employed for house posts and other common purposes. It is not liable to injury from insects.

56 *Taup-sha.* Employed for house posts, and would answer for common carpentry, but it is subject to split; the bark is supposed to be medicinal.

57 *Teng-khat.* This is a heavy white wood, solid and fit for turning purpose; used for rice-pounders, &c.

58 *Thab-ban.* This is used for boat-building and making carts; timber sometimes 70 feet long: it is a kind of Teak, but rather heavier than the usual kind. Sp. Gr. 0·814,

59 *Tha-bwot-gyee.* This is a good heavy valuable timber, somewhat like iron-wood.

60 *Tha-byion.* A useful timber, probably a Eugenia.

61 *Tha-khwot.* This wood is useful for sandals; it is a kind of white Teak.

62 *Thammai.* A strong, handsome wood, like Ægiceras, or box-wood.

63 *Than-kya.* The fruit of this tree is employed for ring-worm. The wood is like Saul.

64 *Thanna-Dan.* Said to be a fruit tree; it is a reddish-brown, heavy wood, fit for machinery or other purposes requiring great strength; it is totally exempt from attacks of insects, but somewhat liable to split.

65 *Tha-nat.* It is a kind of grey Teak.

66 *Than-that.* Used for stocks of various intruments; it is a capital wood, and seems to be a kind of Saul.

67 *Theet-phyion.* This is used for fan handles; it is a useful white wood ,and would answer for common carpentry; it resembles Mimosa serissa.

68 *Theng-gan.* Employed for house posts, carts, boat-buildings, paddles, and oars. It is an excellent compact wood, fit for gun carriages.

69 *Theet-to.* This is said to be a fruit tree; the wood is employed in boat building, making carts, &c. It is a dark-brownish grey, hard, heavy wood.

70 *Theet-ya.* Employed for rice grinders or pounders. It is a superior, compact, close, tough, brown wood, fit for any thing requiring great strength and durability.

71 *Theim.* Used as house posts, rafters and general purposes of carpentry.

72 *Thep-yeng.* Said to be a fruit tree: the trunk affords a compact, fine grained wood.

73 *Toung-bien.* Used in boat-building and for making carts. It is a strong, heavy wood, well adapted for handles of tools, &c; it is probably a kind of Teak.

74 *Toung-tha-khwa.* This is a capital wood for any purpose, gun-carriages or gun-stocks.

75 *Toung-tha-byiou.* Used for house posts; it is a strong, red, heavy wood, a kind of Mimosa.

76 *Toung-thau-gyee.* A hard, compact wood of dark-brown colour.

77 *Tseet.* Employed as house posts and in boat bulding. Saul of small calibre.

78 *Tsekka-doun.* This is said to be a fruit tree; the wood is used for house posts, rafters, and boat-building; it is like Teak, but much disposed to split.

79 *Tshan-tshay.* A useful wood, but liable to attacks of insects, and to split.

80 *Tshaup-yo.* Used for house posts and musket stocks. It is a heavy white wood, exceedingly strong, but liable to attacks of insects.

81 *Tshiet-khyeen.* Used for house posts. A superior kind of crooked-grained Saul.

82 *Tshwai-lwai.* Used for musket stocks and sword sheaths; it is a hard, red, crooked grained wood, fit for cabinet work.

83 *Tsoay-dan.* Heavy, hard, tough wood, not subject to insects, and, being tough and short, it is suited for wheels, musket-stocks &c.

84 *Tswot-ba-lwot.* This is said to be a fruit tree; the wood resembles Jarrool, a Lagerstrœmia.

85 *Yammandy.* Used for carving images and making drums. It is a useful and valuable wood.

86 *Yeng-taip.* It is a strong useful wood for posts and common carpentry.

87 *Yetha-byay.* This is used for house posts and boat-building; it is a strong wood, suited for door-frames and common carpentry.

88 *Yoga-theet.* The wood is used for carved images, and the bark used as soap.

89 *Zee-byion.* This is a compact, close wood like Lagerstrœmia, or white Jarrool. It is used for house posts, and is liable to split, but is free from the destructive influence of insects.

90 *Yeng-bywom.* Employed for house posts. It is a useful wood, equal to Jarrool.

(8194) *Woods from Amherst and Tavoy Provinces, and Mergui Archipelago, recommended for helves, by Captain Dance, Deputy Commissary of Ordnance Tenasserim Provinces.*

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1 *Lagerstrœmia Pymmah. Peema Nee.* Red Peema.

Maximum girth 6 cubits. Maximum length 30 feet. Very abundant; found all over the Tenasserim and Martaban Provinces. When seasoned, floats in water.

Remarks.—A tough wood, very good for helves, already used for such, and for other Ordnance purposes. The great fault of Peema is its liability to shrink and warp when exposed to the sun or to heat. Peema however has not been fairly tried, if killed and left standing as Teak the tendency to warp might probably disappear.

2 *Calophyllum Longifolium. Therapee.*

Maximum girth 3 cubits. Maximum length 22½ feet. Abundant; found in Mergui, Tavoy, and in lesser quantities near the Attaran River and its branches. When seasoned sinks in water.

Remarks.—Used for masts and yards of Junks excellent for helves but not procurable at Maulmein in sufficient abundance. Strongly recommended to make models.

3 *Tee ka loung* or *Tha* or *Kadat-Ghee.* Burm.

Maximum girth 3 cubits. Maximum length 22½ feet. Abundant; found at Mergui and Tavoy. When seasoned, floats in water.

Remarks—Used for bedsteads, and for house building. Recommended as a durable, tough wood for helves or for hammer handles.

4 *Sibia Glomerata. Thayt Pew Tha* or *White Thayat.*

Maximum girth 5 cubits. Maximum length 30 feet. Abundant ; found on the sea coast from Amherst to Tavoy, and Mergui. When seasoned, floats in water.

Remarks.—The term, Thayat-pew, should be cancelled from the collection, Thayat Pew, meaning white wood, a name equally applicable to "Calophyllum longifolium," "Dillenia speciosa" and Dalbergia species, and other woods. "Ye-mam-nee" is often called by this name. The name Pyew is however that of Mangrove in Mason's "Tenasserim," and I cannot succeed in procuring the true Mangrove.

5 *Artocarpus echinatus. Mountain Jack* or *Tong By-ne.* Burm.

Maximum girth 5 cubits. Maximum length 30 feet. Not abundant though to be found here and there over a large expanse of country. Found all over the Tenasserim and Martaban Provinces. When seasoned, floats in water.

Remarks.—This wood, found on seasoning too light and spongy for durability, should be classed as a useless wood.

6 *Xylocarpus Granatum, Penlaypyoung* or *Peng-lay-oun.* The sea cocoanut.

Maximum girth 4 cubits. Maximum length 20 feet. Very abundant ; found all along the sea shore from Amherst to Mergui. When seasoned, floats in water.

Remarks.—Used by Burmese for all parts of houses, posts, flooring, walls &c. A very good, fine, strong wood, splits with difficulty. Recommended for handspikes, helves, spokes, and handles of tools, also for shot boxes and packing-cases.

7 *Heritiera Litoralis, Konzozaloo* or *Kanazoe,* from the sea shore.

Maximum girth 4 cubits. Maximum length 30 feet. Very abundant on the Islands ; found on Pannat Island and all the Mergui Archipelago, also all along the coast of Amherst province. When seasoned, floats in water.

Remarks.—Used for boats, boxes, planks of houses &c. a very light wood, scented, durable and tough. Recommended for fuzes beyond any other wood in the collection : also for helves, and for gunstocks. Strongly recommended for packing cases of all descriptions.

8 *Heritiera Minor, Kanazoe,* a Forest Fruit tree.

Maximum girth 2 cubits. Maximum length 15 feet. Very abundant, but straggling ; found in Martaban, and on both sides of Moulmein river, and all along the sea coast ; an unlimited supply of this procurable. When seasoned, floats in water.

Remarks.—Name of this sounded as the other Konnayzow but the wood different. When seasoned, it is tough, light and durable. Used for boats also piles of bridges, boats, and many other purposes. Recommended for helves, but should be killed a twelve month before being cut, down, or otherwise should be seasoned by keeping after it has been cut down. Both of these "Kanazoe" woods said by Dr. McClelland to resemble Soondree wood in strength and durable qualities.

9 *Kunnan Tha* or *Crab Tree.*

Maximum girth, 4 cubits. Maximum length 30 feet. Abundant; found on an Island called Pielo Island near Mergui, but scarcely procurable in Moulmein. When seasoned, the red variety sinks and the white floats.

Remarks.—Used for houses, zyats &c. a very durable wood of handsome grain. Of this wood, there are two kinds, red and white ; the latter lighter than the former, likely to answer for helves ; the former too heavy for that purpose. Both woods very good for turning purposes.

10 *Kaya Nan* in Tavoy, *Kaiyah* in Moulmein. N. B. The wood called Kyanan in Moulmein and by Mason, is Tavoy red wood, Syndesmus Tavoyana.

Maximum girth 2¼ cubits. Maximum length 15 feet. Very abundant ; found on the sea coast, from Amherst to Mergui : also on banks of rivers in the Province of Martaban near the sea. When seasoned, floats in water.

Remarks—One of the best woods in the country for helves ; tough, light, very durable, plentiful ; long in the fibre, neither liable to split nor to warp nor to break readily. Used by Burmese for planes, spears, boats, stocks of guns and all kinds of purposes. This wood is of a most beautiful color, a combination of Pink cream color and red, and bears a very high polish. Recommended for helves, handles of tools, hand spikes and spokes of gun carriage, and timber wheels ; also for gun stocks and planes.

11 *Parrawah.*

Maximum girth 3 cubits. Maximum length 22 feet. Abundant ; found all over Tenasserim and Martaban provinces. When seasoned, sinks in water.

Remarks.—A durable smooth-grained tough wood ; used by Burmans for sticks, helves for pickaxes, and hoes, handles of chisels and other tools &c. Recommended for helves and handles of tools generally.

12 *Tha Byke* or *Tha-Bay-Kya.* A kind of Oak.

Maximum girth 1½ cubits. Maximum length 16 feet. Not abundant, but scattered ; found in all forests inland, all over the provinces. When seasoned, floats in water.

Remarks.—A sufficiently light, yet durable, straight grained, tough wood ; used by Burmese for posts, building purposes generally, and various other objects. This wood is recommended as likely to prove excellent for helves, and if t could be procured in sufficient quantities, would be unrivalled for shot boxes

13 *Gongoo* or *Gaungaw.*

Maximum girth 3 cubits. Maximum length 32 feet. Very abundant; found near Mergui, lso thence along coast as far as Amherst. When easoned floats in water.

Remarks.—Used for tables, chairs and miscelaneous articles by the Burmese; a good, hard, ough wood, durable and recommended for helves lso for handles of all kinds of tools. Vide Major Simpson's Report.

14 *Ancestrolobus Carnea; Toungala* in Martaban Provinces, *Zeengalay* in Tavoy.

Maximum girth 3 cubits. Maximum length 30 feet. Not abundant; widely scattered. Found all over the Provinces in the forests, but in none bundant. When seasoned floats in water.

Remarks.—This wood has a good long fibre, enacity, durability and sufficient lightness, is very free from knots; used by Burmese for building, for ploughs and for utensils of all kinds. Recommended for helves and for handles of hisels, hammers and tools generally—said by Dr. McClelland to be plentiful in Pegu and Tonghoo Forests, but rarely to exceed 3 feet n girth.

15 *Bong long Tha.*

Maximum girth 3 cubits. Maximum length 22 feet. Said to be abundant, but has not been asily obtained in Moulmein. Found all over he provinces. When seasoned, floats in water.

Remarks.—A durable yet light wood with a very straight grain; used for every purpose by he Burmese, and much recommended for helves.

16 *Tha nat Khee.*

Maximum girth 3½ cubits, Maximum length 30 feet. Said to be abundant, but has not been asily obtained in Moulmein. Found all over he provinces. When seasoned, floats in water.

Remarks.—A durable yet light wood with a ery straight grain; used for every purpose by he Burmese, and much recommended for helves.

17 *Tay-tha.*

Maximum girth 3 cubits. Maximum length 6 feet. Scarce in Amherst, but abundant towards Tavoy. Found inland also along sea coast all over he provinces. When seasoned, floats in water.

Remarks.—Found subject to dry rot when easoned; a useless wood not recommended.

18 *Mai tai Yo.*

Maximum girth 2½ cubits. Maximum length 22 eet. Abundant. Found all over the province. When seasoned, floats in water.

Remarks.—Used for posts and many other urposes by the Burmese, a particularly good wood for helves, being durable, light, and tough.

19 *Kya Mouk*, a kind of Oak.

Maximum girth 4 cubits. Maximum length 22½ eet. Abundant but widely scattered. Found all over the provinces inland. When seasoned, floats in water.

Remarks.—An excellent tough wood, durable and sufficiently light; used for all purposes by the Burmese. Strongly recommended for helves, hammer handles, handspikes, staves of casks, and many other purposes, but too widely scattered to be easily obtained, unless a large quantity be ordered which should repay a search in the forests: much used by Burmese as a pole for cavady baskets.

20 *Pa-ka-than.*

Maximum girth 2 cubits. Maximum length 12 feet. Abundant but widely scattered. Found all over these provinces inland. When seasoned, floats in water.

Remarks.—Used by Burmese to make paddles, oars, &c, a tough, durable, good wood, but too widely scattered to be easily obtained, unless a large quantity be ordered which would repay a search in the forest.

21 *Dillenia Speciosa. Thee-Bew-Tha.*

Maximum girth 3 cubits. Maximum length 22 feet. Trees abundant, but widely scattered. Found all over the provinces here and there inland. When seasoned, floats in water.

Remarks.—A durable, tough, light, wood, seeming very good for helves. Used by Burmese for building houses and for sundry other purposes; said by Dr. McClelland to afford large and good timber for building houses.

22 *Kye-zai: Laurus, species.*

Maximum girth 2 cubits. Maximum length 15 feet. Scarce, not obtainable at Moulmein. Found along the coasts from Amherst to Mergui; also on the banks of Tavoy river. When seasoned, floats in water.

Remarks.—A very tough wood which has already been often used for helves with great success. Proved of extraordinary strength and tenacity in former experiments. Very durable and not too heavy for helves. Recommended for helves and handles of tools of all kinds, if it could but be procured at Moulmein.

23 *Myouk sho* or *Monkey tree*, (also called *Moulmein Lancewood, Dalbergia.—Mason,*) so called because its pole is so straight, so slippery, and to so great a height free from branches that no monkey was ever seen to climb it.

Maximum girth 4 cubits. Maximum length 40 feet. Very abundant. Found in Tavoy and Mergui: also somewhat abundant all over the provinces inland. When seasoned, floats in water.

Remarks.—A wood much praised in Tavoy, as resembling Lancewood in properties but found to split when seasoned, perhaps good specimens have not been obtained. At any rate other woods of unquestionable value are abundant in Amherst.

24 *Careya aborea. Ban Bambbooai.*

Maximum girth 3 cubits. Maximum length 15 feet. Abundant. Found all over the provinces inland. When seasoned, floats in water.

Remarks.—This timber is useful, durable and tough: used for posts of houses, and for country carts. Recommended for helves though better kinds for that purpose have already been specified. Recommended by Dr. McClelland with other woods as equal in strength to oak and of a promising kind for ship-building.

25 *Kye yo Thoo.*

Maximum girth 2½ cubits. Maximum length 15 feet. Very abundant at Mergui, but not procurable at Moulmein. Found inland up the rivers all over the Provinces. When seasoned, floats in water.

Remarks.—An uncommonly smooth grained, tough, close, yet not heavy wood. Durable and with but one fault, the smallness of its girth, unfitting it for gun carriages. Strongly recommended for helves and handles of tools of all sorts, if it can hereafter be procured at Moulmein; also for handspikes and for spokes. This wood, on careful examination, appears to be identical with Trincomallee wood, though this cannot be positively stated till the flowers of the tree can be procured.

26 *Sow-yew,* or Chisel handle tree, called by the Karens Egg tree, stated by Mason to be of the genus Dalbergia, *species* unknown.

Maximum girth 2¼ cubits. Maximum length 10 feet. Not very abundant, but found scattered all over these forests inland; always found in undulating ground only not near water. When seasoned floats in water.

Remarks—Used by Burmese in preference to any other for handles of chisels and tools, also for helves of axes, and hatchets. A very hard, fine grained wood, which is strongly recommended for helves and handles of all kinds of tools. Unequalled for those tools, such as chisels, which are struck with a hammer or mallet. This wood is of a yellowish white in color with patches of black interspersed, looking as if Iron had in some manner been drawn from the soil, and incorporated in the wood. Though widely scattered, it is in such demand as always to be procurable in the markets.

27 *Shorea Robusta. In-Jin* or *Enghyen,* called in India *Saul.*

Maximum girth, certainly 3, said to be 5 cubits. Maximum length, certainly 20, said to be 30 feet. Abundant. Found inland in Amherst and Tavoy provinces. When seasoned sinks in water.

Remarks.—A thoroughly good and valuable wood. One of the most durable in these forests, tough, elastic, large, and extremely heavy. Used for bows and for all kinds of purposes, by the Burmese. Recommended for handles of hammers chisels and other tools, also for sheave blocks, cogs, and machinery in which great strength is required. Also for government buildings, wharves &c, especially for Railway sleepers, from its singular property of petrifying when long exposed to the action of water, as also, from its abundance and large girth. Too heavy for helves said to strike fire with steel, after having been kept in water for a length of time. Major Phayre stated in a letter his having found several logs of this wood in a creek which is empty in the day season, all of them petrified. This sau appears a closer grained, better, and probably a heavier wood than the saul of India; it seems likely to answer admirably for helves, and fo rammer heads, as well as for the other purposes already specified in this report.

28 *Melanorrhea Usitata. Theetsee.*

Maximum girth certainly 3, said to be 4 or 5 cubits. Maximum length certainly 20, said to be 30 feet. Very abundant. Found in Amherst Province. When seasoned floats in water.

Remarks.—A wood of particularly fine close grain, exuding a black gum which repels ants and is used by the Burmese as a varnish. Very strong, durable, hard and tough, found to answer well for cogs of Machinery. (Vide Artillery Records with report of woods by Captains Simpson and Babington, dated Moulmein 25th May 1842.) Recommended for handles of tools, also of sheave blocks and for machinery generally and for Railway sleepers. Dr. McClelland writes of this wood as follows. "The Lignumvitæ" of Pegu. It is of a dark red color, of a close grain and dense structure. Its great hardness and weight prevents it being employed in house building. It would answer for sheave or block pulleys and other purposes connected with machinery, where great strength and density are required. The anchors of Burmese boats are always of wood to which stones are lashed. The flakes being of Pyeng Khadoe, the stocks of Theetsee or of some other heavy wood. This wood is not brought to Moulmein so heavy as Dr. McClelland describes it. It is procurable at 7 cubits and on high or low ground. Recommended for gun stocks, also for rammer heads, and for helves, *in short* for all purposes as so strong yet not very heavy.

29 *Fagræa. Fragrans, Annan-Tha* or *Annan.*

Maximum girth 4 cubits. Maximum length 20-25 feet. Very abundant. Found in the Provinces of Amherst, Tavoy, and Mergui. Also on islands of the Coast and inland, especially up the Attaran river. When seasoned, sinks in water.

Remarks.—Building houses, kyoungs, zyats, &c., also for piles of bridges, wharves &c., but for the last by the English only, as Burmese think this wood too good for any but sacred purposes: hence Annan wood has been more preserved in these forests than any other valuable wood. It is impervious to the attacks of ants, and of the teredo navalis which will eat all other timber. At Tavoy the posts of a wharf which have for several years been partly dry and partly wet, each day according to the state of the tide, are untouched by the worms. The Burmese ave a proverb about the slow growth of this ee. Annan wood though almost imperishable not capable of bearing so heavy a strain as ome of the other valuable woods of the Province. Vide Artillery Records for 1844, and experiments erein recorded page 531 of "Selections.") ecommended for Railway sleepers, as neither eat nor moisture will warp or rot it.

30 *Hopea Odorata. Thingan.*

Maximum girth 6 cubits. Maximum length 60 et. Scattered but abundant. Found in the rovinces of Yea on the coast beyond Amherst, so at Mergui, and in lesser quantity near oulmein. When seasoned, floats in water.

Remarks.—Formerly considered the most aluable indigenous timber in the southern Provinces. Used at Tavoy and Mergui for building ouses. Used also for canoes, junks, &c. A ery durable excellent wood when kept under ater as in the planks of a boat or under cover on nd ; but often liable to split when exposed to e sun in a dry state. Recommended for helves.

31 *Inga Xylocarpa. Pyeng Khadoe.*

Maximum girth 3 or 4 cubits. Maximum ength 20 or 25 feet. Very abundant. Found l over the Tenasserim province, also at ergui and Tavoy. When seasoned, sinks in ater.

Remarks—This, the Iron wood of these provinces, resists nails, which cannot be driven into . Used for crooks of ships, posts, piles, bridges, c. Recommended for handles of chisels, gouges, c. but too heavy for other ordnance purposes. xcellent for railway sleepers. The only Pyeng hadoe which I can procure here (and I have ad many specimens) has been eaten by worms seasoning, and proved inferior. I suspect that e real Pyeng Khadoe has not yet reached me.

32 *Hopea Odorata. Thingan Pew,* or hite Thingan.

Maximum girth 4 cubits. Maximum length 0 or 40. Scattered but abundant. Found the same localities as the red Thingan. When easoned, floats in water.

Remarks.—A lighter variety of the red Thingan. his is a tolerable wood for durability, and ould do for helves, but more suitable woods re in the list of those recommended.

33 *Acacia elata. Thaeet-Tha.*

Maximum girth 4 cubits. Maximum length 8 feet. Very abundant. Found all along the a shore from Amherst to Mergui. When seaoned, floats in water.

Remarks.—Used for posts of building, a very urable wood ; abundant and of such girth, might e advantageously employed for packing cases, lso, for Government buildings in Burmah. Recommended by Dr. McClelland for cabinet aking.

34 *Pet-Than.*

Maximum girth and length not ascertained ; bundant in Tavoy, not procurable in Moulmein, found in Tavoy and Mergui. When seasoned, sinks in water.

Remarks.—A very hard and durable wood, used by Burmese for wedges. Not recommended, because only procurable at Tavoy and Mergui.

35 *Mezzale.*

Maximum girth 4 cubits. Maximum length 30 feet. Scattered, not very abundant. Found all over the Provinces. When seasoned, floats in water.

Remarks.—Used by Burmese for rulers, malletts and walking sticks ; of very handsome streaked grain like palmyra wood, but not sufficiently durable to be recommended for ordnance purposes.

36 *Meenaban* ; *Apocinaceæ*, or Tavoy Lance wood. Classed by Mason as one of the apocynaceæ and called by him Tenasserim Lance wood.

Maximum girth 1½ cubits even in Tavoy and Mergui where largest. Maximum length 12 feet. In moderate quantities. Found from Tavoy, Mergui and adjacent islands ; also in smaller scantling and scarce, in Amherst Province. When seasoned, floats in water.

Remarks.—Used by Burmese for bows, spears, walking sticks, dhar and chisel handles, &c. an excellent tough, hard, elastic and durable wood, bears a beautiful polish, and makes excellent furniture ; when wanted in but small size only, much recommended for handles of screw drivers, hammers, planes, and all kinds of tools ; also for all purposes for which a close grained heavy wood is required. (Vide Major Simpson's Report.) Does not seem to stand exposure to the direct rays of the sun well, but under cover is found to be a thoroughly good wood for planes, for which this is especially recommended; also for screw drivers and all kind of turning. This is good for all those purposes for which box is now imported.

37 *Laurus* (*Sassafras*). *Carrawaytha*, or *Sassafras wood.* Maximum girth 3 cubits, rarely 4. Maximum length 20 to 30 feet. Not very abundant but procurable. Found from Amherst to Mergui, all along sea coast at Yea, Henzay and other places. When seasoned, floats in water.

Remarks—Used for interior of junks, also for inside works of drawers, boxes &c. as it has a smell which repels insects. A durable wood found, when seasoned and worked up, remarkably tough and strong, excellent for planes, helves, and handles of tools generally, and would be excellent for almirahs in which to keep serge, hospital clothing &c.

38 *Pouk-Tha* or *Than-Yen.* Dr. McClelland reports probably Inga bijemina.

Maximum girth 3 to 4 cubits. Maximum length 22 feet. Widely scattered but abundant. Found inland all over the Provinces. When seasoned, floats in water.

Remarks.—An excellent and durable wood, would do well for handles of tools. This wood is of the same nature as Pyeng Khadoc, of which it is said to be a variety, and the same remarks apply to each of these woods.

39 *Maikay*; *Murraya, species.*

Maximum girth 1 cubit. Maximum length 15 feet. Abundant in Tavoy, but scarce near Moulmein. Found in Tavoy and Mergui districts inland. When seasoned, floats in water.

Remarks.—Too scarce for helves, but recommended for handles of planes, chisels, hammers &c. Used by Burmese for handles of knives and other weapons, a strong, tough wood, in grain like Box wood—(Vide Major Simpson's Report). Recommended by the Ordnance Carpenters as the very best wood, in the collection for planes or for any purpose in lieu of Box.

40 *Pterocarpus Dalbergiodes*, Peddowk or Tenasserim Mahogany.

Maximum girth 6 or even 7 cubits. Maximum length 15 to 30 feet, that of great girth always short. Abundant but scattered. Found all over the Provinces. When seasoned, sinks in water.

Remarks.—A wood already used for gun carriages and for other ordnance purposes and too well known to require comment. This wood takes about two years to season; when cut it has a peculiar and fragrant smell. The ordinary Peddowk, as used in the Gun Carriage Manufactory, needs no comment, but a wood called Peddowk is procurable in abundance at Tavoy, It seems very strong but does not sink and is devoid of smell.

41 *Pinatha.* A kind of Jackwood or a Laurus.

Maximum girth 5 cubits, Maximum girth 25 feet. Very abundant. Found all over the Provinces particularly in the old deserted Town. When seasoned, floats in water.

Remarks.—A light wood with a yellow hue which darkens on exposure. Useful from the yellow dye which boiling extracts from it and which is permanent in cloth, and not effected even by boiling water. It is used by Phoongees. This wood has a fine tone when struck, and is used for musical instruments by the Burmese, it is used by English brush makers for the backs of hair brushes, being a handsome wood which takes a good polish.

42 *Ta-Kouk Tha* Tavoy, *Yay Mine.* (Burmese).

Maximum girth $\frac{1}{2}$ cubit. Maximum length 7 feet. Abundant. Found all over the provinces. When seasoned floats in water.

Remarks.—A durable wood, likely to make good helves or to be useful in turning. Too small in size however to be recommended.

43 *Tim Book Tha.*

Maximum girth, 1 cubit, maximum length 8 to 9 feet. Scarce. Found in Tavoy and Mergui districts. When seasoned, floats in water.

Remarks.—A very good, tough, light wood used by Burmese for many purposes but to small and too scarce to be worth procuring f helves.

44 *Them-Mai-Tha.*

Maximum girth $2\frac{1}{2}$ cubits. Maximum lengt 12 feet. Very abundant. Found on both sid of Moulmein River, and on sea coast: in fac all over these Provinces. When seasoned, float in water.

Remarks.—A wood useless except for firewoo but burns with an intense heat, and is therefo used in preparing salt. Apparently an excelle wood for charcoal for the Arsenal forge or f steamers.

45 *Vateria Lanceolata Pantheya* or *Pa thit-ya.*

Maximum girth 6 cubits. Maximum lengt 60 feet. Very abundant in Tavoy an Mergui, but scarcely procurable in Moulmein Found in Tavoy and Mergui districts : als along the coast near Amherst. When seasone floats in water.

Remarks.—This tree is erroneously calle white Thingan, but it is of a totally different order from that of the Thingan. This is said i Remarks by Major (then Captain) Simpson t be still closer and heavier than Thingan (Vid Artillery Records for 1842). Excellent for to handles, and planes, in short in lieu of Box wood. Like Sow-yew, the Chisel-handle tree, i has a peculiar grain apparently of iron runnin through it. The Burmese use this wood for al purposes for which Thingan is employed, especially in junks. An excellent wood, but with no sufficient spring for helves. Stated by Burmese in Amherst, not to be quite so durable or quit so good as Thingan; though this is not accord ant with Major Simpson's opinion alread quoted.

46 *Kyaitha* or *Itchwood.*

Maximum girth 4 cubits. Maximum lengt 18 feet. Abundant but scattered. Found u the Attaran, Gyne, and Thoungween Rivers nea Moulmein and near Tavoy and Mergui. Whe seasoned, floats in water.

Remarks.—A very compact hard timber, use for posts of houses, zyats, &c. The fibre liabl to start with repeated percussion, and the woo itself subject to dry rot, therefore not recommended. This is called Itchwood because the fruit chips, or bark produce, when touched, an itchin like that caused by Cowitch.

47 *Chee Neb* or *Stinking Wood.*

Maximum girth 4 cubits. Maximum lengt $22\frac{1}{2}$ feet. Abundant. Found in Tavoy an Mergui. When seasoned, sinks in water.

Remarks.—The flowers of this wood have a intolerably fetid sickening smell, hence its name used by Burmese for boxes, tables &c. a long fibred tough wood when new, but rots so readily that with a whole tree in my possession I cannot cut out a decent specimen.

48 *Kyet Thay* or *Theeay Kyay*. Dimensions and extent of supply not known. Found on sea coast from Amherst to Mergui. When seasoned, floats in water.

Remarks.—Used for posts of houses, very durable but not recommended as liable to split.

49 *Dayoo Tha*, meaning Crooked Timber.

Maximum girth 3 cubits. Maximum length 30 feet. Abundant. Found in Tavoy and Mergui. When seasoned, floats in water.

Remarks.—Used for building boats, for planks of houses, ladders &c. liable to attacks of worms and dry rots.

50 *Kanyeen Tha* or *Wood Oil Tree*. Named by Mason as Dipterocarpus Lævis.

Maximum girth 6 cubits. Maximum length 70 feet. Very abundant. Found all over the provinces. When seasoned, floats in water.

Remarks.—Used for rafters and planks, an inferior wood, by no means durable, rots as soon as exposed to water and shrinks readily. Dr. McClelland speaks of this wood most favourably and states it to be of the Saul family. He must mean some other wood, as this is decidedly a bad wood, very porous, and when kept the oil oozes out and stands in globules over it, it warps to a great extent, and though used for cases does not last for more than about two years. (Vide No. 81. page 135 of Dr. McClelland's Report, where this tree is classed as Dipterocarpus turbinatus.)

51 *Ka Meen Tha.*

Maximum girth 2 cubits. Maximum length 25 feet. Abundant. Found all along sea coast near Tavoy and Mergui. When seasoned, sinks in water.

Remarks.—Used for posts and planks of houses; very heavy and durable, but too easily split to be recommended.

52 *Young Tha.*

Maximum girth 3 cubits. Maximum length 30 feet. Found in moderate quantities along sea coast near Tavoy and Mergui. When seasoned, sinks in water.

Remarks.—Used for posts and planks of houses; a heavy and durable wood, not bad for planes or handles, though better woods are already specified.

53 *Neen Tha.*

Very abundant. Found along sea coast near Tavoy and Mergui. When seasoned sinks in water.

Remarks.—Used for rafters of houses; a very heavy wood, but liable to split, therefore not recommended.

54 *Pew Bock.*

Maximum girth 3 cubits. Maximum length 25 feet. Very abundant. Found along sea coast near Tavoy and Mergui. When seasoned, sinks in water.

Remarks.—A strong, tough, durable wood; recommended for helves.

55 *The-La-Bay.*

Maximum girth 3 cubits. Maximum length 20 feet. Not very abundant, obtained from Tavoy, Mergui and Yea. When seasoned, floats in water.

Remarks.—A brittle, useless wood for Ordnance purposes, though employed by Burmese for house posts and to support the shafts of wells.

56 *Mong-dayat nee* or *Red Mong dayat.*

Maximum girth 2 Cubits. Maximum length 15 feet. Not abundant. Found on sea shore from Amherst to Mergui and on Callagouk Island. When seasoned, floats in water.

Remarks.—Used for crooks, and straight parts also of ships, and boats: a light tough wood with a good grain, but too liable to rot to be recommended.

57 *To Dooryan* or *Forest Dooryan.*

Maximum girth 3 cubits. Maximum length 18 feet. Scarce. Found from the sea coast of these provinces and adjacent islands. When seasoned floats in water.

Remarks.— A soft, light, useless timber, liable to rot readily.

58 *Book Tha.*

Maximum girth 1½ to 2 cubits. Maximum length 11 feet. Scarce. Found on the sea coast Amherst to Mergui. When seasoned, floats in water.

Remarks.—Used by Burmese for helves, but rots quickly, and therefore not recommended.

59 *Tay Yo Tha.*

Maximum girth 2 cubits. Maximum length 18 feet. Very abundant. From sea coast and adjacent islands of these Provinces. When seasoned, floats in water.

Remarks.—Used for oars and masts of boats. When this wood is cut, a very acrid caustic juice or sap flies from it which will destroy sight, if it touch the eye or, if it fall on the face, it raises blisters. A wood dangerous to work, and not durable; not recommended.

60 *Thay Yo Tha.*

Maximum girth 5 cubits. Maximum length 25 feet. Very abundant. Found all over Tenasserim and Martaban Provinces. When seasoned, floats in water.

Remarks.—A useless wood; rots very quickly; used for temporary buildings.

61 *Maneeoga*, stated by Burmese to be much used for rice pounders.

Maximum girth 4 cubits. Maximum length 30 feet. Abundant. Found all over Tenasserim and Martaban provinces. When seasoned, floats in water.

Remarks.—Not a good wood, as, when stored, it soon dies and rots; the roots are used for medicine; the fruit is eaten by Burmese, and the wood is well spoken of, though favourable specimens have not been seen, by Captain Dance.

62 *Mah yuh gah.*

Maximum girth 2½ cubits. Maximum length 18 feet. Abundant. Found all over Tenasserim and Martaban provinces. When seasoned, floats in water.

Remarks.—Used for elephant bells; not a durable wood, and therefore not recommended.

63 *Thah Byay Nee.*

Maximum girth 3 cubits. Maximum length 23 feet. Very abundant. Found all over Tenasserim and Martaban provinces. When seasoned, floats in water.

Remarks.—An inferior brittle wood, used by Burmese in short pieces for the props of houses; not recommended.

64 *Thee Khya Tha.*

Maximum girth 1 cubit. Maximum length 12 feet. Very abundant. Found all over Tenasserim and Martaban provinces. When seasoned, floats in water.

Remarks.—A very crooked grained perishable wood; not recommended.

65 *Dow Yat.*

Maximum girth 2 cubits. Maximum length 18 feet. Abundant. Found always inland all over the country. When seasoned, floats in water.

Remarks.—A soft bad wood, useless except for elephant bells.

66 *May-byoung.*

Maximum girth 3 cubits. Maximum length 18 feet. Not abundant. Found near the sea side, and near the mouths of rivers along the coast. When seasoned, sinks in water.

Remarks—Used for anchors of boats, and for the sticks of oil mills; an uncommonly heavy and a durable wood, but not tough enough for ordnance purposes generally, though from its hardness, it makes good planes and turns well.

67 *Pee Ma Pew* or *White Peema.*

Maximum girth 6 cubits. Maximum length 30 feet. Very abundant. Found all our the Tenasserim and Martaban provinces near the red Peema. When seasoned, floats in water.

Remarks.—A tough wood, lighter than Red Peema; does not last for so long a time as Red Peema, and rots in any position when shut out, as in the hulls of ships, in store &c. Not recommended.

68 *Na Pew Gee* or *Let Thouk Gee.*

Maximum girth 1½ cubits. Maximum length 14 feet. Abundant. Found all over the provinces. When seasoned, floats in water.

Remarks.—An useful wood, of inferior grain, and not durable.

69 *Tha Yingee.*

Maximum girth ½ cubit. Maximum length 6 feet. Abundant. Found all over the provinces. When seasoned floats in water.

Remarks.—Utterly useless except for firewood.

70 *Tha Nat Thayt Pew Tha.*

Maximum girth 2 cubits. Maximum length 15 feet. Very abundant.

71 *Kha Moung Tha.*

Maximum girth 2 cubits. Maximum length 22 feet. Very abundant.

72 *Ka theet Tha.*

Maximum girth 4 cubits. Maximum length 22 feet. Not very abundant.

73 *In-Jin Pewoo, White Injin.*

Maximum girth 2 cubits. Maximum length 22 feet. Abundant; found all over the provinces. When seasoned, floats in water.

Remarks.—The above last named four woods very light, perishable, and only fit for firewood. The bark of ka theet tha used by Karens as beetel nut, could probably be useful in tanning.

74 *Thah yay Bew.*

Maximum girth 2 cubits. Maximum length 20 feet. Not very abundant. Found inland all over the provinces. When seasoned, floats in water.

Remarks.—Not a durable wood.

75 *Thay kya Ba.*

Maximum girth 3 cubits. Maximum length 24 feet. Very abundant but straggling. Found inland all over the provinces. When seasoned, floats in water.

Remarks.—Used for house posts, but not a durable wood.

76 *Thay Tha.*

Maximum girth 3 cubits. Maximum length 22 feet. Widely scattered. Found inland all over the provinces. When seasoned, floats in water.

Remarks.—A tolerably good and tough wood, liable to rot in store, and therefore not recommended.

77 *Thah Byay Ynet Ghee* (means with large leaves.) Maximum girth 3 cubits Maximum length 22 feet. Widely scattered. Found inland all over the provinces. When seasoned, floats in water.

Remarks.—A tolerably good and tough wood, spoken of by Dr. McClelland as a strong and close grained timber.

78 *Tha Pyke Tha.*

Maximum girth 5 cubits. Maximum length 30 feet. Very abundant. Found along the banks of rivers, all over the provinces. When seasoned, floats in water.

Remarks.—A wood of no durability, not recommended.

79 *Kyai Yew.*

Maximum girth 3 cubits. Maximum length, 22 feet. Rather scarce. Found all along the banks of rivers all over the provinces. When seasoned floats in water.

Remarks.—Used by Burmese to make charcoal, also sometimes for posts of small huts: too brittle to be recommended.

80 *Toung Bye Nay.*

Maximum girth 5 cubits. Maximum length, 30 feet. Scarce. Found along the banks of rivers all over the provinces. When seasoned, floats in water.

Remarks.—A brittle short-grained wood. Not the mountain jack though similar to it in name.

81 *May Shoung.*

Maximum girth 2½ cubits. Maximum length 18 feet. Scarce. Found on sea coast, Amherst to Mergui. When seasoned, floats in water.

Remarks.—A short fibred, brittle, yet soft wood, not durable; called, but erroneously, a kind of Annan by the Burmese. Not a durable wood, and besides too scarce for ordnance purposes.

82 *Tha Bate Kee.*

Maximum girth 3 cubits. Maximum length 18 feet. Scarce. Found all over the Province near the sea and at the mouths of rivers. When seasoned, floats in water.

Remarks.—A short, fibred brittle, yet soft wood, not durable.

83 *Mong-Dayat Pew, or White Mong-Dayat.*

84 *Maximum* girth 2½ cubits. Maximum length 22 feet. Scarce. Found all over the provinces near the sea and in the mouths of the rivers. When seasoned, floats in water.

Remarks.—Not a good wood, being very perishable.

85 *Kab-Ban-Tha.*

Maximum girth 6 cubits. Maximum length 30 feet. Scarce. Found inland in Amherst and Tavoy Provinces. When seasoned, floats in water.

Remarks.—Makes beautiful furniture, and when long buried in ferruginous mud, turns of a *very dark* red. Found to make excellent planes; used in Tavoy jail with great success, for all tool handles, and much recommended for such as do not receive direct percussion, as screw drivers, augers, hammers, handles; in fact for all tools except chisel handles, which are to be struck with a hammer, for which the Chisel-handle tree, "Dalbergia," *Species*, is the best; makes excellent planes; stated by Dr. McClelland to be most plentiful in Tharawaddy district, and to be hard, of fine grain and used in constructing carts. The writer has seen a quantity of this lately sold (in August 1857) for export to Holland as a furniture wood.

86 *Kyee Tha*, named by Mason as *Syndesmus Tavoyana*; and also called *Kyay Mishoung*, named by Dr. McClelland as *Barringtonia acutangula.*

Maximum girth 2½ to perhaps 3 cubits. Maximum length 10 or 12 feet Very scarce in Moulmein, but sufficiently abundant at Tavoy. When seasoned, sinks in water.

Remarks.—Same as Kab-ban-tha.

87 *Tha Bong Pew.*

Maximum girth 2 cubits. Maximum length 15 feet. Abundant. Found on the sea coast, Amherst to Mergui. When seasoned, floats in water.

Remarks.—Liable to attacks from worms, rots readily, a brittle inferior wood.

88 *Koung Moo.*

Maximum girth 5 cubits. Maximum length 30 feet. Scarce. Found near Moulmein, also near Tavoy and Mergui on the sea coast and on the banks of rivers. When seasoned floats in water.

Remarks.—Not a good wood, but perishable and liable to rot readily.

89 *Na Yoo-ya.*

Maximum girth 3 cubits. Maximum length 22 feet. Scarce. Found all over the provinces. When seasoned floats in water.

Remarks.—A durable tolerable good wood with a curled grain; used by Burmese for oars, much like English oak in appearance, but deficient in tenacity. Not recommended, being scarce, while equally good woods are abundant.

90 *Khai Yah.*

Maximum girth 2½ cubits. Maximum length 22 feet. Scarce. Found all over the Province. When seasoned, floats in water.

Remarks.—A tolerably good wood, but not recommended because like the "Na-yoo-ya" it is too scarce.

91 *Dalbergia Latifolia, Yendaik; Black wood.*

Maximum girth 2 cubits. Maximum length 10 or 12 feet. Abundant in Tavoy and Mergui, elsewhere scarce. Found all over the provinces, but mostly in Tavoy and Mergui. When seasoned, sinks in water.

Remarks.—This, unlike the Black wood of India, has a fetid smell like that of new Corduroy and a white grain interspersed amongst the black and red. It is not so handsome a wood as Indian black wood, but is far tougher, is not brittle, excellent for spoke shaves, for handles of screw drivers augers, gimblets. Used by the Chinese carpenters for planes, and is excellent for that purpose though heavy; but they use smaller planes than we do. Like others of the hardest woods of Burmah, it is so full of natural cracks, that two feet of timber are wasted for one foot made up after being sawn; but when made up, this wood cracks no more and resists sun or rain admirably. The "Tai" is not Yendaik but Ebony, and is brittle and devoid of smell.

92 *Phyoo.*

Maximum girth 1½ cubits. Maximum length 17 feet. Abundant. Found in Tavoy and Mergui, also in less abundance in Amherst Province. When seasoned, floats in water.

Remarks.—A tolerably good strong wood, but not with much tenacity of fibre.

93 *Tye Yoo Tha or Lan Thah.*

Maximum girth 2 cubits. Maximum length 22 feet. Scarce. Found in Tavoy and Mergui, also in less abundance in Amherst province. When seasoned, floats in water.

Remarks.—A bad brittle wood readily splits and warps.

94 *Phet Honway.*

Maximum girth 3 cubits. Maximum length 22 feet. Scarce. Found at Tavoy and Mergui. When seasoned, floats in water.

Remarks.—A short grained brittle wood, splits and rots readily.

95 *Ouk Guay.*

Maximum girth 1½ cubits. Maximum length 15 feet. Scarce. Found all over the provinces. When seasoned, floats in water.

Remarks.—The root of this tree is used as a medicine by Burmese, the wood perishable, and grain short.

96 *Ngy-soung Tha.*

Maximum girth 3½ cubits. Maximum length 22 feet. Abundant. Found all over the provinces. When seasoned, floats in water.

Remarks.—A wood of no durability or strength; splits readily, with a short grain. Only fit for firewood.

97 *Na Ghee.*

Maximum girth 3 cubits, Maximum length 15 feet. Abundant. Found all over the provinces. When seasoned, floats in water.

Remarks.—A tolerably good wood, used for malletts, but not durable enough to be recommended.

98 *Tayet Khyee.*

Maximum girth 2 cubits. Maximum length 15 feet. Abundant. Found all over the provinces, When seasoned, floats in water,

Remarks.—A pretty wood in grain, but one which rots when it dies: of no durability.

99 *Murrh Neen.*

Maximum girth 2 cubits, Maximum length 15 feet.

Abundant. Found all over the provinces on low grounds. When seasoned floats in water.

Remarks.—A petty wood, looks exactly like deal, but stated to have no durability.

Additional List of Woods, by Captain Dance, Dep. Commissary of Ordnance, T. P. 28th July 1856.

100 *Yemmanee,* Tree not known but Karens say it bears a yellow flower and small plum which is the favorite fruit of the barking deer. Vide Masons Tenasserim, page 213.

Maximum girth 4 cubits. Maximum length 20 to 30 feet. Very abundant. Found inland near the banks of the Gyne and Attaran Rivers and at the back of the Mountains near Moulmein. When seasoned, floats in water.

Remarks.—Very durable; used by the king of Ava for his carved furniture, also by Burmese for boats, a slightly scented wood, the lightest i the collection; free from cracks. Excellent fo fuzes and appears quite free from acid or from tendency to rot.

101 *Soway Do.*

Maximum girth 1½ cubits. Maximum length 10 or 12 feet. Very abundant. Found on se. coast and on the banks of rivers in these provin ces. When seasoned, floats in water.

Remarks.—A wood much recommended fo gun stocks with but one fault; that it i crooked and therefore not more than ten o twelve feet can be procured between the bends. This wood is commonly sold to Burmese fo half rupee a piece, large enough to make one gun stock.

102 *Thayet Kya.*

Maximum girth 2 cubits. Maximum length 20 feet. Not very abundant, but occasionally procurable. Found inland near the back of hills near Moulmain, and here and there all over the provinces. When seasoned, floats in water.

Remarks.—Durable and light, a good wood for helves if indented for with other woods for the same purpose.

103 *Chin Zooay.* Meaning Elephants-teeth.

Maximum girth 1½ to 2 cubits Maximum length 10 feet, Abundant on the hills. Found inland, always on rocky barren hard ground in mountainous or hill districts all over the provinces When seasoned, sinks in water.

Remarks.—This wood is believed by the writer to be the hardest and strongest known in these latitudes, perhaps anywhere in the world. It is however only procurable in such rocky spots as no other tree will grow in, so must be sent for on purpose. It cuts up as does yendaik and other hard woods do with huge cracks through it; in fact this is the most wasteful of all known valuable timber in this respect and the original scantling is but small, so that it is not recommended for general purposes, but it is invaluable for the edges of Phillester Planes for spoke shaves and for such purposes in which much scantling is not required.

104 *Than That.*

Maximum girth 2 to 3 Cubits. Maximum length 12 feet. Very difficult to procure. Found inland up the Gyne and Attaran Rivers. When seasoned, floats in water.

Remarks.—Very durable; used by Karens for bows, for shoulder yokes, spear handles and many other purposes. Excellent for hammer handles from its tough fibre.

105 *Yeen Ga.*

Maximum girth 2 cubits. Maximum length 15 feet. Very abundant, found in Moulmein itself, and scattered over the provinces. When seasoned, sinks in water.

Remarks.—Stated to be good for helves, not so strong as Chisel handle tree but possessing its properties in an inferior degree; and good for helves. Rupees 45 per 50 feet by 1 foot square Used by Burmese for helves, for mamotties, and is a very pretty white wood for furniture.

106 *Moketammatha.* Meaning Martaban wood.

Maximum girth 1 cubit. Maximum length 8 feet. Very abundant; found in Martaban and its adjacent jungles, also all over the provinces especially on the banks of rivers. When seasoned, sinks in water: uncommonly heavy.

Remarks.—Stated to be used for the same purposes as chisel handle tree, but still stronger.

107 *Gyew.*

Maximum girth 2 cubits Maximum length 15 feet. Abundant; found in the jungle round Moulmein and all over the provinces. When seasoned, floats in water.

Remarks.—Stated by Burmese to be equal to chisel handle tree, Dalbergia, species, but if so the writer has not yet seen a favorable specimen.

108 *Pinlay Jallat.*

Maximum girth 2½ to 3 cubits. Maximum length, 15 feet. Tolerably plentiful. Found by the sea side and very near to waters edge, in these provinces. When seasoned, floats in water.

Remarks.—A wood strongly recommended for fuzes, free from oil, and acid, light, yet strong; it is much used for rockets of enormous dimensions and for wooden guns, used for the burning of the dead Phoongees and on other occasions.

109 *Bee-ew*, not identical with *Thee Bew Tha.*

Maximum girth 3 cubits. Maximum length 22 feet. Trees very abundant. Found near the sea or the rivers edge, all over the provinces. When seasoned, sinks in water.

Remarks.—A very hard, strong wood; used in rice mills where great strength and wearing well are indispensably required: recommended for handles of tools.

110 *Kussoo,* not identical with Kye-zai.

Maximum girth 2 cubits. Maximum length 15 feet. Abundant. Found near the sea or the rivers edge, all over the province. When seasoned sinks in water.

Remarks.—A very tough wood, durable, and as good as Kyazai, for helves. The Kyezai is a wood of the colour of oak with a yellowish tinge. The Kussoo is nearly white. This is not the soondree wood, of which latter the Burmese name is nearly the same, and the soondree wood Captain Dance failed to procure hitherto.

111 *Kyai tha.*

Maximum girth 1½ to 2 cubits. Maximum length 7 feet. Scarce. Found on low marshy grounds in these provinces, but widely scattered. When seasoned, sinks in water.

Remarks.—Excellent for planes, or for any other purpose, for which a straight grain, great toughness and strength are required.

112 *Phangah.*

Maximum girth 4 cubits. Maximum length 23 feet. Very abundant. Found in jungles near Moulmein and all over the provinces. When seasoned, sinks in water.

Remarks.—Used by Burmese for poles of carts and by the poorer class for houses; very strong and likely to make good planes, handles, or helves.

113 *Tunyeen* or *Tunyeen Dha.*

Maximum girth 5 cubits. Maximum length 30 or 40 feet. To be procured in moderate quantities. Found scarce near Moulmein and Sittang rivers, more abundant near Tavoy and Mergui. When seasoned, floats in water.

Remarks.—Used for construction of those very large boats which go from Moulmein to Tonghoo; hence in much demand here, but not so much so on the sea coast. A wood which when cut, has a peculiar and fragrant smell, is tough and oily, and likely to make excellent planes, handles &c. &c.

114 *Ebony. Diospyros, Tai.*

Maximum girth ½ to 1 cubit. Maximum length 8 feet. Very scarce. Found from the forest in the direction of Shuay Gheen. When seasoned, sinks in water.

Remarks.—This wood, much sought for by Captain Dance could not be procured in Moulmein in sufficient abundance for it to be suitable for any ordnance purpose.

Concluding Remarks dated Moulmein 30th September 1857. From all enquiries, it appears that the prices of all the useful woods specified in the above List are about the same, viz: Rupees 45 per ton. This List is in substitution of that before forwarded with letter No 305 dated first May 1856 from Captain Dance to the Military Board; which latter was requested to be cancelled. The three headings of woods for helves, woods too heavy but useful for other purposes, and useless woods, have been retained as first classed, though some of the first class have been found useless, some of the second good for helves, and some of the third (as yendaik) valuable; but fresh numbering would cause confusion, and opposite to each wood is specified, whether it be useful, and if so for what purpose.

(8195) *Archipelago of Eastern Asia.*

Extensive collections of woods from Borneo, New Guinea, and several other of the Archipelago islands, were contributed to the Exhibition of 1851, including sandal wood from Timor, and Lingoa or Amboyna wood, from Ceram, in the Moluccas.

1 *Lingoa* or *Amboyna Wood.* This wood, which is very durable, and takes a high polish, was imported from the Moluccas in considerable quantities at the time when the latter were British possessions; it is very abundant, and may be had in any quantity. Very large circular slabs are obtained from the lower part of the tree by taking advantage of the spurs, or

lateral growths; they are sometimes as large as nine feet in diameter. A circular disk of wood thus obtained, nearly seven feet in diameter, as well as some other specimens, were exhibited by Messrs. Almeida (P. 891), of Singapore, and were deemed deserving of a Prize Medal by the Jury.

2 *Kayu-Buka.* Specimens were also shown of the "Kayu-Buka," which is brought from Ceram, New Guinea, Arru, and the other islands of the Moluccas, to Singapore; it is a knotty excrescence, which forms on the stems of the Lingoa tree, and is much esteemed as a fancy wood for cabinet-work; of late years its estimation seems to have decreased in Europe, but it is still much valued by the Chinese. For a list of the wood from Labuan—see, Timber of Labuan.

(8196) *Canara Timber and Fancy-Woods.*

The forests of Canara continue to furnish large quantities of the best timber produced in Southern India, but, the government authorities seem to have directed their attention principally to preserving the Teak, Sandalwood, Blackwood, Jackwood, Wild Jack and Poon trees of these forests, to the comparative neglect of other valuable woods. In the years 1843-44 to 1851-52 inclusive, the teak supplied from the Canara forests to the Bombay Dockyards and remaining in store amounted to 7831 logs, equal to 26714 candies, and the expenses incurred in delivering the same amounted to Rs 1,47,277-1-8 or about six rupees per candy. There was, also, in addition, 784 logs equal to 2783 Bombay Candies of Jungle wood. In the Fusly years 1251 to 1260 inclusive there was exported from Canara by sea, of Teak 18,187 candies, Poon Spars 6918 in number: of Sandalwood 86 Candies and Blackwood 362 candies. In 1837, Col. Frith gave a list of 29 woods of Canara. In 1844, Dr. Gibson gave another of 32 Woods; both of these lists were merely in their native names, but, some years later, in 1845-46, the latter gentleman gave a list of 64 timber trees and Fancy woods with scientific, Canarese and Mahratta names, which he had found in the forests of Canara and Soonda. It is as follows.

1 Teak. Tectona grandis. At Gond, Barnunbulee. Mawlinga, Berchee, &c., above the Ghats, and in other parts of Yellapore talook. A few trees in Honore, north of foot of Hosul-Mukki Ghats about 18,000 small estimated in Ankolen and Honawur Divisions. The timber most esteemed in India.

2 Sissoo. Dalbergia latifolia. Cano Betee. Abundant and large at north end of Dandelee forest; scanty eslewhere. Used for Gun-carriages and house furniture. For the former so valuable that large plantations have been formed in waste places of the north-western provinces of Hindostan.

3 Kurec Murra. Ebnoos, *Hind.* Diospyros Ebenum. Not common, found near Oopenputam in Canara; also below the Woolwee Ghat, Only used for delicate and costly cabinet work.

4 Mainthee, *Canarese.* Aeen Mack. Pentaptera coriaeea. The most common tree in the large jungles both above and below. Beams and pillars for houses: also for ships and boats. The heart wood is one of the most durable known; on account of its weight, it is preferred for firewood.

5 Pentaptera panieulata. Kinjul, *Mahratta.* Kondul, *Canarese.* Nearly as common as the last. Qualities similar to the P. eoriacea.

6 Belec Waulke, *Canarese.* Arjoon Sadur. Pentaptera arjuna. Only by rivers and streams mostly below the Ghats; reaches an immense size. Timber commonly reported as good, I would judge it to be inferior to P. coriaeea and P. panieulata. Bark medicinal.

7 Goonjun Murra, *Canarese.* Asanna, *Mahratta.* Briedelia montana. Found in Canara, common in Dandelee, where it reaches a great size. Many fine logs have been exported by merchants, since the cutting of teak trees was interdicted. Hardly inferior to teak and stands water equally well. If it has not been already tried for naval purposes, it seems well worthy a trial.

8 Bellee Nundee. Nundee Muna. Bondara also Mana, *Mahratta.* Lagerstrœmia parviflora. Most common in the Dundelee forest above; also not uncommon below; reaches a large size. Wood tough and valued for its qualities in standing water. Greatly in use for beams, rafters and boat timber.

9 Saguree Murra, *Canarese.* Koosumb, *Mahratta.* Schleichera Trijuga. Most common below, where it reaches the size of a large tree; not uncommon in Dundelee forest. Wood very tough and valuable: is always preferred for sugar and rice mills. Fruit gives an oil.

10 Mootr Murra, *Canarese.* Pullus, *Mahratta,* Butea Frondosa. Most common below and in Dandelee forest; grows large, but always gnarled. Wood hardly distinguishable from teak and is of similar qualities. Flowers and gum valuable in the arts, and the former also in native medicine.

11 Cheekul Murra. Keenye. Aeaeia alata. Found above and below, pretty common. Ripe wood; strong and useful for houses.

12 Halec Dasul, *Canarese.* Tannana, *Mahratta.* Lagerstrœmia Reginæ. The Ben Teak of Malabar. Near the banks of rivers below. Here it reaches large size. Wood of same family as Lag. parviflora; qualities similar. Used in houses and boats.

13 Helbulsoo, *Canarese.* Pat Phunnus, *Mahratta.* Artocarpus hirsuta. Above and in the ravines of the Ghats; but mostly in

Honore and Bilgy talooks. Valuable for canoes and for planks.

14 Ran Funnus, *Mahratta*. Artocarpus sylvestris. Dark jungles on and near the Ghats to southward. Wood of quality somewhat similar to last; but inferior to it.

15 Kori Kowan. Satween, *Mahratta*. Alstonia scholaris. Not very common; but found near the Ghats above and below of great size. Wood white, compact and valuable for the turning lathe.

16 Jamba Murra. Jamba, *Mahratta*. Mimosa Xylocarpa. Chiefly above the Ghats in Soopeh and Dandelee, where it grows large. Wood very useful in house building—tough and strong.

17 Soorhunni, *Canarese*. Koolmurra, *Canarese*, Calysaccion angustifolia. In ravines of the Ghats and below in sheltered valleys; not common in north Canara and Soonda. The tree used here for "Poon" spars.

18 Yetega. Yetegal, *Canarese*. Hedoo. Murra, Nauclea parviflora. Rather common below; more rare above. Is valued as affording the best plank for flooring of houses and house beams.

19 Minjul Mara, *Canarese*. Bukool, *Mahratta*, Mimusops Elenji. In the high jungles close above the Ghats; reaches great size. Wood serviceable for houses, not used in ships or boats. Fruit eatable.

20 Hanee Murra, *Canarese*. Beebla, *Mahratta*. Pterocarpus dalbergioides. Common in large jungles; above and below. Wood strong and useful for houses. Gum used in the arts and in medicine.

21 Bel Kambi, *Canarese*. Acacia amara. Above the Ghats not inland and not north of Gungawalli river. Ripe wood, strong and tough. The natives deem it (wrongly) a species of Ebony.

22 Dal Murra, also Dul Murra. *Can.* Pabba, *Mah.* Chikrassia tabularis. In the tall jungles near and on the Ghats, particularly at Gunesh Good. Wood white, but tough and close grained. From its general situation, it is hardly known to the carpenter.

23 Gher Murra, *Can.* Biboona, *Mah.* Semecarpus anacardium also Semecarpus cuneifolia. Common above and below, but most so above. Wood good for houses and beams. Juice used in the arts and in medicine.

24 Holgeree, *Can.* *Mah.* In: Holigarna longifolia. Mostly above near the Ghats S. of Nilcoond. Wood of same qualities as the last. Juice dangerously acrid.

25 Burrul Murra, *Can.* Kanta Sacer. 2 species of Bombax. Most common below; grows to a great size. Hollowed for canoes; planks sought after for light boxes.

26 Kuta Mura, *Can.* Kudum. Nauclea orientalis. Rather rare and found chiefly below. Wood strong and serviceable, used for gunstocks. Hardly common enough for house or ship purposes.

27 Sampga, *Can.* Tambut. Kudkee. Hocomlia montana. On and close to head of the Ghats; seldom runs large. Wood white, hard and tough; used for agricultural implements.

28 Dodelee Mura, *Can.*: *Mahrata* no name, Sterculia alata. In deep ravines and sheltered places below the Ghats; grows to an immense height. Used here only as a support for pepper vines. The wood is said to be too spongy for spars, for which its height and straightness otherwise well fit it.

29 Yels Kae, *Can.* Berli Mar, *Mah.* Caryota urens. Throughout the forests above and below; but most common above. Affects sheltered valleys. One of the most useful trees in the country. Pith gives fine Sago meal. Trunk in universal use for water conduits. Root hollowed for the bucket used in irrigation. Abounds in Tari or Palm wine. I have heard that the farm of this tree throughout the Yellapore district of Soopeh, yields Rs. 30,000 per annum.

30 Hali Mura, *Can.* Tursee Phul, *Mah.* Chrysophyllum acuminatum, Star apple. Very common in the jungles near the Ghats above, particularly to the south. Reaches a great height. Wood worthless; fruit eaten. The tree seems to contain the new commercial product termed Gutta Purcha. This product is known to be furnished by a tree of this family.

31 Hagin Kae. Hagin Mura. *Can.* Mar tree not found with us. Nauclea, *Sp.* Flower not seen. Frequent in upper third of the Ghats to the south. Wood described as being strong and serviceable for houses and implements.

32 Kulli Kae. Ficus *Spec*: Generally a climber. Abounds in the country from Bilgy to the Ghats. Juice peculiarly abundant and viscid. It is used as a Bird Lime. Well merits a further examination.

33 Andgeree, *Can.* Ind. Yeroo, *Mah.* Sapindus or Nephelium *Sp.* Flower not seen. Above the Ghat chiefly at the Nilcoond and southern jungles. Wood said to be serviceable in house building.

34 Nooskool, *Can.* Char, *Mah.* Buchanania latifolia. Most frequent above the Ghats, particularly north of Dandelee. Wood is strong and tough, but seldom found squaring above four inches. Fruit delicate like almonds.

35 Kowla, *Can.* Koombha. Careya arborea. One of the most common trees above and below. Always seems to run gnarled. Wood said to be superior for edging of wells as it stands water. Part of the fruit medicinal.

36 Kulgul, *Can.* Kurmul, *Mah.* Dillenia Scabrella. Most common below the Ghat. Grows large, long, and straight. Wood seems to be used for boat plank in Canara. With us it is not reckoned a choice wood.

37 Darsoox Mura. Damun, *Mah.* Grewia obliqua. Found mostly below, seldom grows large. Wood used in agriculture, house posts, &c.

38 Bura Nuge, *Can.* Karmubu. Par Jamb, *Mah.* Olea dioica. Most common and near the Ghats above. Wood white, but strong, compact, and useful.

39 Goomun Mura, *Can.* Gootee, *Mah.* Zyziphus xylopyra. Most common below the Ghats. Never grows very large. Wood used for implements. Fruits employed in the arts.

40 Bomle Mura. Ind. Binteki. Below and near the Ghats only. Wood very serviceable for plank. Seems to be used only for this purpose.

41 Koote Legree, *Can.* Khete, *Mah.* Sapindus. In ravines below: high lands in Canara, not common. Wood of average quality for building. Nut used in the arts.

42 Sarul Mura, *Can.* Kunchun, *Mah.* Bauhinia purpurea. Found both above and below; most common near the Gungawallee creek. Wood strong and good for agricultural implements; but seldom large enough for building.

43 Suola Mura, *Can.* Cedrela Toona. Toon. I have found this choice tree only in one situation, viz., island of Koorsulee; but it probably exists all along close below the Ghats. A species of Mahogany. Wood is much used in Bengal for furniture and other purposes.

44 Dhoop, *Can.* Dhoop. Googul. *Mah.* Canarium, 2 species. On the Ghats above, and the second speeics seems to be cultivated near Bilgil; and also at Siddapore, great size. The choice Gum resin afforded by these trees is extensively used in the arts and exported both inland and to the coast. Wood very good.

45 Mudde Doop. Ind. Ailanthus Malabaricus. Near the Ghats above. Dhoop. Wood worthless, gives a resin nearly similar to No. 44.

46 Allikae. Allubikae. *Can.* Heari. Terminalia chebula. Abounds above the Ghats. Wood of average quality for houses, &c. Nuts have of late years become an extensive export, is a dye in place of nut galls.

47 . Taree Mura, *Can.* Yehela, *Mah.* Terminalia bellerica. Common both above and below; one of the greatest trees in the forest. Wood serviceable for houses but not first rate; used also for plank.

48 Tuktuka. Keersel, *Mah.* Bignonia chelonoides. Found above and below, but not common. Wood good for building.

49 Parul, *Mah.* Bignonia suaveolens. Common in the Dandelee forest above. Wood of quality similar to last.

50 Wurus, *Mah.* Bignonia quadri-locularis. Mostly in the higher valleys of the Ghats. Wood much used for planks to carts, &c. It is tough and durable.

51 Moorgul Mura. Kokeem, *Mah.* Garcinia purpurea. Wild Mangosteen. Mostl below and near valleys. A beautiful tree. Value for its fruit which is extensively exported as native condiment. The concrete oil also is muc valued. Wood good.

52 Kireemula, *Can.* Name not known Flower &c. not seen. Jungles between Bilgil an Nilcoond; said to be choice wood for masts o boats, &c. Worthy of further inquiry.

53 Undi Mura, *Can.* Goolumb, *Mah* Samus of 2 species. Abundant in the souther Ghat jungles above, large and straight. Woo good as it abounds in an aromatic oil, which preserves it from insects. It is mostly in situations too remote from water for the wood merchant.

54 Kurwul. Diospyros Ind. *Spec.*: Grea jungles in the Ghats above, chiefly to the south. Ripe wood particularly good, as it has the ebony heart.

55 Dal Bulloo Geera; unknown. Elevated plateau between Gungawalee and Black rivers, does not reach a great size. Wood very strong and tough, sought after for agricultural implements.

56 Memecylon tinctorium; Surpa, *Mah.* Iron wood of 2 species. On the upper head of the Ghats; wood very tough and strong for cart axles, &c. The beautiful flowers extensively used as a dye.

57 In Jugga. Hoom, *Mah.* Ind Uvaria spec. Jungles east of Kursulee on Black river; runs tall and straight. Wood strong and useful, it is not much known.

58 Nagin Koora, *Can.* Tabernæmontana citrifolia: common on the hills near and below Ghats. Wood white, but tough and strong. Never large.

59 Kakae, *Can.* Bawa, *Mah.* Cassia fistula: Common above and below. Wood of average quality. Pods a rather extensive article of commercial export.

60 Chikakae, *Mah.* Mimosa saponaria. Ghat jungles generally. Pods and bark exported from Canara—the former as a washing material, the latter for dyeing and tanning fishing nets.

61 Bubbe Mura. Calophyllum spurium. Banks of rivers and streams, above the Ghats chiefly. Wood used for canoes. Seeds afford much oil.

62 Mot. Mooshun Hunoo. *Can.* Garcinia, *Spec*: or a Xanthochymus. Above the Ghats only, where common to the south. Abundant. Juice is not used medicinally. Large Wood good: fruit is eaten.

63 Ghan Seng, *Can.* Khurseng, *Mah.* Bignonia Xylocarpa. Mostly above the Ghats. Wood good. Never reaches a large size.

64 Beta Goonda, *Can.* Uvaria, *Spec.* Jungles inland of Nilcoond. Wood of rather superior quality, being straight and tough.

Errors excepted, (Signed) A. GIBSON,
Supt. Conservator of Forests.

CEYLON WOODS.

(8197) *Ceylon.* The late Sir George Anderson sent us the following list of 96 *Timber Trees* in *Ceylon*, drawn up by Mr. Adrian Mendis, Mohandiram of Moorrotto, and Master Carpenter, Royal Engineer's Department.

Names. Cynghalese. Botanical.	Locality. Provinces.	Weight per cubic foot.	Durability.	Uses, &c.
A		lbs.	years.	
1 Andere. Acacia vera.	Eastern.	71	15	Cross-bars of fishing dhonies, and pins for wooden anchors.
2 Madetiye. Adenanthera pavonina.	Western.	56	30	Common house buildings. Produces a red seed which is roasted and eaten.
3 Kebelle. Oblique Euginea.	Northern.	40	20	Common house building.
4 Cottamba. Almond.	W. & Southern.	38	30	Common house building; and fruit eaten for food.
5 Welipiyanna. Anissaphyllum zeylanicum.	Western and Northern.	35	40	Common house buildings.
6 Cocatiye. Aponogeton crispum.	Western.	56	30	Do. do.
7 Puwak. Areca nut.	Western Eastern and Southern.	57	60	Pins for furniture and pingo sticks. The nuts esteemed a luxury are chewed with nuts betel leaves, tobacco and chunam.
8 Patta Del. Artocarpus, sps.	Southern.	34	30	Boats and buildings. Fruit (9×2½ in,) boiled and eaten as food.
9 Cos. Jack. Artocarpus integrifolia.	South Eastern and Western.	42	25—80	Fruit weighing from 5 to 50lb. used in various ways for food. Timber in general use for building boats, and all kinds of furniture.
10 Del. Artocarpus pubescens.	E. S. & Western.	40	25—50	Boats and buildings. The fruit (9 in. × in) is used as an article of food.
11 Aludel. Artocarpus pubescens.	Western.	51	35—70	Fishing boats and house buildings. The fruit (9 in. × 3 in.) is boiled and eaten as food by the natives.
B				
12 Bairiye.	Northern and Western.	57	10—30	Found chiefly near the mouths of the rivers—used for anchors and in house building.
13 Mee. Bassia longifolia.	Northern.	61	25—80	Keels for dhonies, bridges and house buildings. A useful medicinal oil is obtained from the nut of this tree.
14 Petan. Bauhinia tomentosa.	Eastern.	57		Boxes, chests, walking sticks, cornice work &c.
15 Lunu Midelle. Common Bead tree.	Western.	15	8—20	The small sticks and branches used in common buildings, and outriggers for dhonies and fishing boats; the timber for panels of carriages, buoys, targets, &c.
16 Hal Milile. Berrya ammonilla.	Northern and Eastern.	48	10—80	Casks. tubs, carts, waggons and house building. The best wood for oil casks in the Island.
17 Tal. Palmira. Borassus flabelliformis.	Northern and Eastern.	65	80	Reepers, rafters. From its leaves the native ola books are made. Toddy is drawn from the flowers, from which jaggery is manufactured. This is used occasionally for hardening mortar, as also for medicinal purposes.
18 Calukeale. Butea frondosa.	Central.	38	30	Common house building.
C				
19 Calu Mediriye. Calamander. Diospyros hirsuta.	Southern and Western.	57	80	A scarce and beautiful wood; the most valuable for ornamental purposes in Ceylon.
20 Waldombe. Calophyllum acuminatum.	Western.	39	20	Common house buildings.
21 Gorrukeenee. Calophyllum calaba.	Western.	44	25	Poles for bullock carts and house buildings.

Names. Cynghalese. Botanical.	Locality. Provinces.	Weight per cubic foot.	Durability.	Uses, &c.
		lbs.	years.	
22 Dombe. Sweet scented Calophyllum.	Western.	40	5—10	Masts, and cross-sticks of yettra dhonies and fishing boats; and poles of bullock carts.
23 Mahadan. Calyptranthes cumini.	Northern and Western.	36	20	Common house building, wheels, &c. The berries are eaten when fully ripe.
24 Battedombe, Clove-tree leaved Calyptranthes.	Western.	45	20	Common house building.
25 Alubo. Jambolana Calyptranthes.	Central.	49	20	Common house building.
26 Kahatte. Careya arborea.	W. & Southren.	38	10—20	Axles for bullock bandies, and buildings.
27 Davette. Carallia zeylanica.	Western.	42	25	Roofings for common buildings.
28 Kittool. Nepera. Caryota urens.	W. & Southern.	71	30—90	Reepers and window bars. The toddy drawn from the flowers is a sweet and cooling drink; and is also converted into jaggery.
29 Dawol kuroendo. Cassia cinnamomum.	Central.	39	20	Common house building.
30 Arremene. Sumatra Cassia.	Central.	57	50	Furniture and house buildings.
31 Hedde woke. Choccarpus pungens.	Western.	58	50	Common house building.
32 Burute. Satin. Chloroxylon Swietenia.	Southern and Eastern.	55	10—80	Oil presses, waggon wheels, bullock carts, bridges, cog wheels, buildings and furniture.
33 Mal burute. Flowered Satin, Chloroxylon Swietenia.	Northern and Eastern.	57	80	Furniture. This wood is perhaps the most valuable in Ceylon next to Calamander.
34 Nelly. Cicca distica.	Central.	49	30	Buildings, wheels, &c. Used in wells the wood is said to purify the water. The berries are made use of for sweet-meats, and also for medicinal purposes.
35 Cocoanut. Cocos nucifera.	Sea coast generally.	70	20—50	Buildings, fancy boxes and furniture. The fruit furnishes almost all the staple articles of food in a tropical climate—milk. curry, water, oil:—the flower yields toddy, from which arrack, jaggery and vinegar is manufactured; the husk coir for ropes, mats, &c.; the leaves are woven into cadjans; and every part of the tree is useful in a multitude of ways.
36 Wea warene. Cratæva religiosa.	Central.	62	60	House buildings and pestles.
37 Hal Mendora. Branch flowered Cynometra.	Western.	56	8—20	Bridges and house building.
38 Gal mendora. Branch flowered Cynometra.	W. & Southern.	57	15—60	Bridges and buildings. The best kind of wood for under-ground purposes.
D				
39 Nendoon. Dalbergia lanceolaria.	W. & Southern.	56	60—80	Buildings and furniture.
40 Daminne.	Eastern.	44	40	Gun-stocks and common house buildings.
41 Gode parre. Toothed Dillenia.	Western.	51	60	Roofs for houses.
42 Horre. Turbaned Dipterocarpus.	Western.	45	15	Roofs of common buildings.
43 Doon. Dipterocarpus sp.	Central.	29	50	House buildings.
44 Dive parre.	Western.	44	20	Common house buildings.
E				
45 Caluvere. Ebony.	N. and Eastern.	71	80	A fine black wood, used largely for buildings and furniture.

	Names. Cynghalese. Botanical.	Locality. Provinces.	Weight, per cubic foot.	Durability.	Uses, &c.
			lbs.	years.	
46	Kadoembeiriye. Bastard Ebony.	Western.	45	40	Furniture. The heart of this wood is occasionally met with of extraordinary beauty.
47	Kiri walla. Lance leaved Echites.	Northern.	35	30	Used principally for inlaying ornamental furniture and cabinet work.
48	Book attene. Echites scholaris.	Western.	26		Coffins.
49	Timbery. Embryopteris glutinifera.	Northern.	45	20	Common house buildings. The juice of the fruit is used to rub over fishing lines for the purpose of hardening and preserving them.
50	Walboamboo. Eugenia laurina.	Central.	36	15	Common house buildings.
51	Naw, Iron wood. Mesua ferrea.	Western.	72	10—60	Bridges and buildings, &c.
52	Kiripelle. Indian fig tree. Ficus indica.	Southern.	30	20—30	Common furniture and house buildings.
53	Hunukirille, Grewia paniculata.	Southern.	44	25	House building.
54	Belygobel. Telia leaved hibiscus.	Western.	38	20	Carriages, palanqueens and hackeries—found near rivers.
55	Nerreloo, Illicebrum latrum.	Central.	56	40	Common house building.
56	Dive ratembela. Jonesia asoca.	Northern.	58	25	Common house building.
57	Katie kale.	Eastern.	42	25—50	Common house building and in the construction of yettra dhonies.
58	Murute. Lagerstrœmia reginæ.	W. & Southern.	42	30—40	Water casks and buildings.
	M				
59	Hulanhick, Melia sp.	Central.	39	50	House building.
60	Rameneidelle, Millingtonia. sp.	Western.	48	20	Common house buildings. The sticks make excellent fences.
61	Sappoo. Michelia champa.	Central.	42	20—50	Carriages, palanqueens &c. also in buildings.
62	Sooriva Mara. Mimosa.	Central.	42	20—30	Buildings and common furniture.
63	Moone Mal. Mimusops elengi.	Southern.	61	50	House building and furniture.
64	Paloo. Mimusops hexandra.	Eastern.	68	10—70	Oil presses, bridges and buildings. The berries are eaten when ripe.
65	Morre. Eye ball.	Central.	62	25	Common house building. Berries eaten when ripe. Furnishes the best firewood for lime and brickkilns, next to Galmorre, Nephelium.
66	Etteiriye. Ash leaved Murraya.	Eastern.	61	10—70	Handles of mamoties, hammers and bill-hooks ; and rafters for cadjan roofs.
	N				
67	Helembe, Nauclea parviflora.	W. & Northern.	42	40	Common house building.
68	Nebede.	Sou. & Western.	51	20	Common house buildings.
69	Gal morre, Nephelium, sp.	Central.	65	30	House building. Berries are eaten when ripe by the natives. Supplies the best kind of fire-wood for brick and lime kilns.
	O				
70	Koang. Ceylon Oak.	Southern.	42	5—10	Native oil presses and wooden anchors. Berries are eaten by the natives.
71	Melle. Olax Zeylanica.	Eastern.	64	40	Common house building.
	P.				
72	Patkeale.	Western.	42	40	Common house building.
73	Penebarroo.	Eastern.	61	50—90	Rafters, &c. Fences made of the sticks of this tree are the most durable of all.

NAMES. Cynghalese. Botanical.	Locality. Provinces.	Weight, per cubic foot.	Durability.	USES, &c.
		lbs.	years.	
74 Sooriya. Persian.	Central and Western.	49	20—40	Admirable for carriages, hackeries, an gunstock ;—also useful for blocks an buildings.
75 Velenge. Pterospermum ruberifolium. R.	Central.	36	5—70	Poles of bullock carts, beetel trays, an gunstock.
76 Hirikoddol. Rhizophora. Sp.	W. & Northern.	49	35	Common house building. From th bark a dye is extracted.
77 Cadol. Leafy mangrove. Rhizophora.	Northern and Western.	65	40	Found chiefly near the mouth of the rivers —the wood is used for common hous buildings, and from the bark a dye is extracted for colouring leather, nets, sails &c.
78 Pehimbive. Rhus disipium.	Central.	68	50	Buildings.
79 Otte. Rottleria, sp. S.	Western.	36	10	Common house building.
80 Lawoloo. Sapota, sp.	Western.	39	10	Common house building. Berries are eaten by the natives.
81 Pamburoo. Simonia citrifolia.	Southern.	48	40	House building, &c. When variegated i is a beautiful wood and is used for furniture and cabinet works, Buoys for fishing nets, &c.
82 Daanga. Long flowered Spathodea.	N. and Western.	23		Buoys, for fishing nets, &c.
83 Telemboo, Sterculia fœtida.	Central.	26	30	Common house buildings.
84 Suvande.	Western.	56	30	Common house buildings.
85 Siyembela. Tamarindus Indica.	North Eastern and Western.	80	80	Oil presses, furniture and building. The fruit is a well known and agreeable article of diet.
86 Teak, Ceylon, Taikke Ceylemey. Tectona grandis.	Western.	55	15—60	Bridges and buildings.
87 Teak. Cochin. Taikke Cotchive.	Cochin.	44	15—90	Carts and waggons, bridges, building, and arrack casks. The wood of these casks imparts a fine colour and flavour to the arrack.
88 Teak, Maulmein. Taikke Molmine.	Maulmein.	42	15—90	Do. do. do. do.
89 Ukbeiriye.	Southern.	51	80	Common house buildings.
90 Hal. Vateria indica.	Western.	26	10	Packing cases, cielings, coffins, &c.
91 Caha Milile. Vitex trifoliata.	Southern and Western.	56	15—80	Water casks, pade boats, waggon wheels bullock carts, bridges and house building.
92 Mecan Milile. Vitex trifoliata.	Western.	56	20—90	Bridges, pade-boats, carts and waggo wheels, water tubs, aud house buildings.
93 Sappoo Milile. Vitex trifoliata.	Western and Southern.	49	10—40	Water casks, cart and waggon wheels pade-boats, bridges and house buildings
94 Samedera. Vitmannia trifoliata.	Western.	26	60	Buoys, &c.
95 Walukeene.	W. & Southern.	39	10	Masts of dhonies.
96 Tarrene. Webera cerifera.	Northern.	57	30	Roofings, and in the construction o fishing boats and dhonies.

(8198) *Chittagong Woods, by Capt. Marquart.*

1. Conocarpus, Buthna.
2. Diospyros melanoxylon.
3. Dipterocarpus, sargotiah.
4. Acacia, sp, koom koyre.
5. Swietenia chickrassia, Chuckrassee.

Circars; Northern Circars and *Godavery.*

The forests on the Godavery and on the mountainous tracts which run parallel with the coast in the northern parts of the peninsula, furnish a great variety of useful timbers and fancy wood, of which perhaps only a small portion have been letermined and made known. The following ists from the Reports of the London Exhibition of 1851 and from that of Madras of 1857, enumerate some woods of value.

1 *Odina wodier*, Goompana wood. Goompana kurra.

2 Ganara wood. Ganara kurra.

3 *Feronia elephantum.* Wood-apple wood; 'alaga kurra, Koweet, Vella marum.

4 *Pentaptera tomentosa.* Nulla muddi wood, Nulla muddi kurra : Caroomaroodum.

5 *Pentaptera glabra.* Tella muddi wood, Tella uddi kurra Vel maroodum marum.

6 *Cassia auriculata.* Tangada wood, Tangadu urra, Auvarai marum.

7 Paya wood. Paya kurra.

8 Annen wood, Annen kurra.

9 *Morinda citrifolia*, Togara wood. Togara urra.

10 Red dye wood, Vizianagrum Zemindary.

11 *Bombax Malabaricum* or *heptaphyllum* ooroogа wood, Burnga kurra.

12 *Strychnos potatorum*, Induga wood, Induga urra. Thæ than marum.

13 *Cordia myxa*, Muckaroo wood, Mukkera urra.

14 Tobica wood, Tobica kurra.

15 Tellavoolemara wood. Telloovoolemara urra.

16 *Diospyros chloroxylon*, Nullavoolemara wood ullaveloomara kurra Mimosa cinerea. Vulture ood, Vulture kurra.

17 Ficus racemosa Bodda wood, Bodda kurra.

18 Voodaga Voodaga wood.

19 *Pterospermum Heynei*, Lolooga wood olooga kurra.

20 *Thespesia populnea*, Gungrane wood, Gungane kurra. 5. Poovarasa murum.

21 *Æschynomene grandiflora* Aguste wood.

22 *Erythrina Indica* Bandita wood, Bandita urra

23 *Sapindus emarginatus* Soap-nut, or Koonoodoo wood,-Koonkoodoo kurra.

24 Camooga wood, Kumoogamurum.

25 Doduga wood.

26 Cumba wood, Cumba kurra.

27 Goomoodoo wood, Goomoodoo kurra

28 Unkoodoo wood, Unkoodoo kurra.

29 Undooroo wood, Undooroo kurra.

30 Iscarawsee wood, Iscarawsee kurra.

31 Ghantha wood, Gantha kurra.

(8199) The following timber trees of the Godaery forests and of the Circars between Bhadra ellum and Condapillay are extracted from a atalogue by Lieut B. H. Beddome, published in e Juries Reports of Madras Exhibition of 1857.

1 Ausandra, *Tel.* Acacia ferruginea, Wood very ard and useful : this tree is very like "Prosopis icigera" when only in leaf.

2 Arawee Neem, *Tel.* Sclerostylis atalantioies. This tree I found in the Circars only. Wood yellow and very hard, might be used as a substitute for box : it is always small however.

3 Balsu, *Tel* Canthium parviflorum, A dark colored hard and pretty wood ; good for turning.

4 Bare Kala goru, *Tel.* Spathodea Roxburghii. Wood is said to be useless. Roxburgh however says that it is used for various purposes. Buffaloes are very fond of the leaves.

5 Boja, Godavery Forests, Konda tangedu. (Circars,) *Tel.* Inga xylocarpa. A valuable timber, grows very large on the mountains.

6 Bilugu. *Tel.* Chloroxylon Swietenia. The satin wood.

7 Buta karamee, *Tel.* Nauclea parviflora. Wood close grained and hard.

8 Badama, *Tel.* Terminalia Catappa. Wood very strong.

9 Botku, *Tel.* Cordia, new species. A very beautiful wood. It would answer as a substitute for Maple for picture frames &c. This tree is abundant in the Godavery Forests near Mahadeopore : it does not extend down to the Circars. It is found near Warungul. It also is indigenous to the Jubbulpore forests, where it is called "Deyngan." It is I feel certain the tree described by Dr. Griffiths as "Hemigymna Macleodii." He described it from dried specimens and thought that the leaves were opposite (instead of alternate) otherwise his description and native name agree.

10 Chinta, *Tel.* Tamarindus India. The tamarind tree, a beautifully grained wood.

11 Chilla, *Tel.* Strychnos potatorum, A very hard and close grained wood.

12 Chitla Matta, *Tel* Gardenia gummifera. A small tree. The wood is hard. The natives eat the fruit.

13 Chandam, *Tel.* Pterocarpus santalinus. A hard red wood, not found on the right bank of the Godavery.

14 Chilka dudugu, *Tel.* Guatteria cerasoides. Appears to be a tolerably hard. wood and does not seem to warp. The natives however on the Godavery do not use it, and say that it is soft.

15 China nagee, *Tel.* Lagerstrœmia parviflora, Wood said to be good.

16 Chinna kalinga, *Tel.* Dillenia pentagyna. A very strong, hard wood, abundant on the Indrawatty and in jungles on the left bank of Godavery ; not known on the right bank.

17 Chinna botku, *Tel.* Cordia angustifolia. Wood used for posts and in house building. This tree is common about villages in the Circars, but I never, I think, saw it in the jungles.

18 Duria maddee also kora maddee and koraman, *Tel.* Briedelia spinosa. Wood appears to be very strong and good. Cattle eat the leaves most voraciously.

19 Dulchirram, *Tel.* Acacia Halkora. An enormous tree. Wood hard and reddish.

20 Dudippa (Godavery Forests), Chetippa

(Circars). *Tel.* Hymenodyetion. A large tree. Wood not used in the Godavery forests.

21 Googal, *Tel.* Shorea robusta, Abundant on the banks of the Indrawatty—a valuable timber. This tree yields the dammer.

22 Goomer tek, *Tel.* Gmelina arborea. The large trees of this yield a very hard durable wood. The yoke for Bullocks is made from it.

23 Ippee, *Tel.* Bassia latifolia. A strong wood, but never felled by the natives, the flowers yield a toddy, and an oil is extracted from the seeds.

24 Irkee (Godavery), Pedabotku (Circars), *Tel.* Cordia myxa. Wood never used by the natives in the Godavery forests. In the Circars ploughs are made from it.

25 Jitegee [Godavery Forests] Yeroogoodoo [Circars] *Tel.* Dalbergia latifolia. A valuable mottled black timber.

26 Jana, *Tel.* Grewia Rothii? Wood very hard and much used in the Circars.

27 Jammee, *Tel* Prosopis spicigera. The natives say that this wood is very inferior.

28 Kanregu, *Tel.* Flacourtia sapida. A very hard close grained wood which does not warp—worthy of attention.

29 Karinga (Godavery Forests) [Pella Manga circars], *Tel.* Gardenia lucida. Wood not used on the Godavery but it is in the Circars. It seems to be very hard and close grained and adapted for turning.

30 Koree (Godavery Forests), Korivipal (Circars), *Tel.* Ixora parviflora. A hard wood.

31. Koorseea—Koorsee, *Tel.* Cluytia collina, Wood very hard and reddish.

32 Kala goru, *Tel.* Bignonia chelonoides. A good fancy wood—abundant on the right bank of Godavery. I did not meet with this or B. suaveolens in the Circars.

33 Kalagoru, *Tel.* Bignonia suaveolens. Wood very similar to B: chelonoides, but of a redder hue.

34 Karcheea. *Tel.* Nyctanthes arbortristis. A hard useful wood—does not attain much size.

35 Karaka. *Tel.* Terminalia chebula. A very hard valuable timber.

36 Kanigu. *Tel.* Pongamia glabra. Wood said to be strong, it does not appear to be used.

37 Komee. *Tel.* Stylocoryne Webera. Wood prettily marked and hard—much esteemed by the natives—it is very small however.

38 Kankadu. *Tel.* Sapindus emarginatus. A yellowish prettily grained wood—it is tolerably hard.

39 Koila Mookree (Circars's and lower Godavery jungles) *Tel.* Wrightea tomentosa Wood not used—it appears close grained. The juice is a permanent yellow dye. Bark given internally for scorpion bites.

40 Lolugu, *Tel.* Pterospermum bynea? Wood pinkish and hard, it is generally hollow in the centre.

41 Manehee jamudu. *Tel.* Euphorbia tirucalli, Grows to a large tree. Wood seems hard but not used.

42 Mamari. *Tel.* Mangifera Indica, the Mang tree.

43 Mushtee or Musadee. *Tel.* Strychnos n vomica. Wood very hard and strong—white an will not touch it.

44 Maredu. *Tel.* Ægle marmelos, Wood ve strong. The native dhol is often made from th wood.

45 Marree. *Tel.* Caryota urens. Abundant c the banks of the Indrawatty—it yields a wi and also a meal like sago.

46 Makkam. *Tel.* Schrebera swietenoide A very hard valuable wood—it never warps.

47 Marree. *Tel.* Ficus Indica. The drops this tree yield a heavy hard timber.

48 Muchi twikee (Godavery forests) Warm gul. *Tel.* Diospyros: sp. A very hard light colore wood.

49 Nerar. *Tel.* Syzygium jambolanum. Woo said to be strong.

50 Nar yepa (Godavery). *Tel.* Hardwicki binata Wood red. very hard and heavy; ofte hollow in the centre.

51 Nulla muddi, *Tel.* Terminalia tomentos also T. coriacea. Valuable well known timbers.

52 Nara botku, *Tel.* Eriochlena Hookerian A strong hard wood—(something like the Botku a new species of Cordia)

53 Naooru also Nagool, *Tel.* Premna tomen tosa. A pretty looking wood—worthy of atten tion as a fancy wood.

54 Nulla sandra, *Tel.* Acacia sundra. A ver hard wood—on the Godavery the musal is always made from this wood.

55 Nulla kaka mushti, (Circars only.) *Tel* Diospyros, sp, D. Sylrtica? Wood whitish an very hard.

56 Nalla manga, (Circars only.) *Tel.* Randia sp Wood very hard and close grained—a good woo for turning—(a good sized tree armed.)

57 Nulla regoo (Godavery Forests) *Tel.* Canthium didymum. Centre wood mottled and of a dark color like old seasoned oak.

58 Nakeera, Ximenia americana. Wood only used for fuel.

59 Nowlee eragoo, *Tel.* Vitex arborea. Wood hard of a yellowish brown color.

60 Nalla muddee, *Tel.* Maba buxifolia. Very small—but a hard pretty wood.

61 Pashee also Pannchee, *Tel* Anogeissus acuminatus. A very strong hard timber.

62 Peda sopara (Godavery Forests,) Yerra patseroo (circars). *Tel.* Dalbergia frondosa. A strong useful timber.

63 Porilla sopara (Godavery) Tella patsaroo (circars) *Tel.* Dalbergia paniculata. Wood perfectly useless—it is arranged in rings with softer substance in between layers.

64 Pal dautam (Godavery). Peda pul mera

Circars). *Tel.* Ehretia lœvis, A hard valuable wood, though not of great size.

65 Peda Karinga, *Tel.* Gardenia latifolia, Wood close grained; promises well for turning.

66 Papirree also Papatta, *Tel.* Pavetta tomentosa. Wood hard but very small.

67 Pedda man, *Tel.* Ailanthus excelsa. Wood oft, never used by the natives.

68 Paspoo Karamee (also Bundaroo) *Tel.* Nauclea cordifolia. A yellowish valuable wood; hat of the very large trees is very superior—rom smaller trees it seems rather soft.

69 Pul i-shinta, *Tel.* Bauhinia: sp. Said to e a good hard wood—not apparently described. Legume filled with a scented pith.

70 Palla, also peda palla, *Tel.* Mimusops hexndra. Wood very hard.

71 Poosku *Tel.* Schleichera trijuga Most abunant in Godavery forests. Wood hard, heavy nd strong. The large musal for pressing the Sesamum Oil is always made of it—also ploughs.

72 Peda kalinga, *Tel.* Dillenia speciosa. A very ard wood. In jungles on the N. of Godavary.

73 Peda dulchirram, *Tel.* Godavery, Dirasau, ircars. Acacia speciosa. A valuable timber.

74 Pedda chilka dudugu, *Tel.* Uvaria tomentoa. A very strong yellow wood, much similar but uperior to " Nauclea cordifolia." Cowars are ade from it—also used in house building—it oes not warp.

75 Peda kal mesura, *Tel.* Cascaria sp. Wood ght yellow, hard, does not warp—worthy of tention. A large tree—leaves ovate, oblong abrous, serrulate, flowers 8 anthers capsule 3 lved with 3 ridges on the outside of fruit. ruit used to poison fish.

76 Patcha botku (Circars only) *Tel.* Cordia olygama. Strong close grained wood (small and ooked.)

77 Poonkee, *Tel.* Gyrocarpus Jacquini. Wood ft and light, much used for making cowrie oxes and toys, takes paint and varnish well. ella poonkee " Givotea Rottleriformis" is used so for the same purposes.

78 Reygutti, *Tel.* Capparis grandis. Wood ry hard and good.

79 Renga, *Tel.* Zyziphus jujuba. Wood strong d much used by the natives.

80 Sheriman, *Tel.* Anogeissus latifolius. Wood id to be one of the hardest in the forests. It ows to an enormous size. Axils of carts genery made of this.

81 Soomee, *Tel.* Soymida febrifuga. Wood very rd and valuable—never rots under ground—ry much used in building—of a reddish color.

82 Tek, *Tel.* Tectona grandis. The teak tree.

83 Tella Maddee, *Tel.* Terminalia glabra. A ell known timber.

84 Torelaga, *Tel.* Limonia acidissima. Wood ry hard—worthy of attention.

85 Telega (Godavery forests and Dekhan) *Tel.* Gardenia sp. Wood very hard, would be very good for turning.

86 Tharra, *Tel.* Grewia tiliæfolia. Grows very large on the mountains—a valuable timber—much used for handles of axes, pellet bows, cowars, walking sticks.

87 Tunkee (Godavery) tookee (Circars) *Tel.* Diospyros melanoxylon. The centre wood black and very heavy. The Godavery ebony.

88 Tella motku, *Tel.* Dalbergia Oojeinensis. Wood valuable—it is rather rare.

89 Thabsee, *Tel.* Sterculia urens. Wood soft and useless.

90 Tella sopara. (Godavery forests only) *Tel.* Acacia elata. Wood strong and much valued.

91 Telsoo (Godavery) Shinduga (Circars) *Tel.* Acacia odoratissima. A valuable well known timber.

92 Togaree Mogillee (Godavery) Mogillee (Circars,) *Tel.* Morinda exserta. Wood hard and useful, does not warp.

93 Tella sandra, *Tel.* Acacia suma Wood very good and strong—abundant in the Aukeesah jungles.

94 Tella tuma, Acacia leucophlæa. Wood hard—it is used for various purposes by the natives.

95 Tuma, *Tel.* Acacia Arabica. Wood valuable and well known,

96 Tella Manga, *Tel.* Gardenia lucida. A close grained wood. I think it well adapted for the lathe.

97 Tedla pal, *Tel.* Wrightia tinctoria. A beautiful wood, hard and like ivory—most valuable for turning.

98 Tella kaka Mushtee, (Circars only,) *Tel.* Sponia? Appears to be Celtis Wightii of Wight's Icones. One of the hardest woods I have ever met with—light colored, well worthy of attention.

99 Tellapoonkee (Circar hills only,) *Tel.* Givotia Rottleriformis. A very light soft wood—See remarks under Poonkee.

100 Usarka, *Tel.* Emblica officinalis. A hard valuable wood.

101 Ulinda also Yelinda, *Tel.* Diospyros chloroxylon? A very hard useful wood, grows to a large tree on Circar mountains; it is generally a shrub about the Godavery forests.

102 Uskia Man (Godavery) Uri-widee (Circars), *Tel.* Cratoeva Roxburghii. Wood very hard. The native dhol is often made of this wood.

103 Udugu, *Tel.* Alangium decapetalum. An ornamental, beautiful wood—attains a fair size in the forests.

104 Wodee, *Tel.* Spathodea Rheedii, (Bignonia spathacea Roxburgh.) Wood strong, whitish.

105 Yeggee, *Tel.* Pterocarpus marsupium, A well known timber. The native dhol is often made of this.

106 Yepa also Yapa, *Tel.* Azadirachta Indica. A valuable timber.

107 Sterculia colorata (Godavery forests,) Wood useless.

108 Bignonia xylocarpa. Wood very hard, tree rare in Godavery forests.

(8200) *Coimbatore List* by Dr. WIGHT, of 133 woods procurable in the Coimbatore district.

1. Diospyros ebenaster Ainsl. *Ebenaceæ* Icon.188. Aeha marum.Tam. This name is copied from Ainslie and I am still uncertain whether this is the species that yields the ebony of the Palghaut jungles, as there is reason to believe more than one species contributes wood black enough to pass current for ebony. The plant produced to me, under that tamool name, is Bauhinia tomentosa a widely different tree but having a very dark or black heart-wood.

2 Chickrassa tabularis. *Cedrelaceæ*, Ill. 55. Aglay marum, Tam. This is the Swietenia chickrassa of Roxburgh and Ainslie, the Chittagong-wood of commerce. Here it, in common with one or two other light red coloured woods, currently passes under the general name of cedar and bastard cedar, and all are extensively employed in cabinet making, this has quite a cedar-like smell

3 Alangium decapetalum. *Alangieæ*, Icon. 194. Alingie marum, Tam. The wood of this small tree is said by Roxb. to be "beautiful" and when tried was found to sustain a weight of 310 lbs., but it wants size I have never seen a tree that would give a 10 inch wide plank.

4 Artocarpus hirsuta. *Artocarpeæ*. Angelly marum. Tam. This is the Artocarpus pubescens of Willd. and Ainslie, it is scarcely entitled to a place in this list of Coimbatore woods, being a native of the coast and not extending so far inland. It is a large tree used on the coast for making canoes and such like purposes.

5 Odina woodier *Terebinthaceæ*, Icon, 60 Anny currer or woody maram. Tam. Called also oodav and generally supposed a very useless tree. The wood is very difficult to season requiring to be kept, even in planks, 2 or 3 years, but once well seasoned it is a close grained beautiful wood well adapted for cabinet-making pur-poses.

6 Bauhinia racemosa. *Leguminosæ*. Atchc marum, Tam. This is B. parviflora of Roxb., not mentioned by Ainslie. The tree is small but the heart wood exceedingly hard and fine. The bark furnishes a kind of natural rope, being merely peeled and slightly twisted when it is ready for use.

7 Ulmus integrifolia. *Ulmaceæ*. Ayah marum. Tam. large sized tree, wood reddish coloured, good for general purposes—said to yield to boiling water a peculiar odour, which when mixed with common arrack gives it the flavour of the more expensive palmira arrack and enables the venders to obtain better prices for their adulterated article.

8 Givotia Rottleriformis. *Euphorbiaceæ*. Bootallic marum. It seems curious that this tree, so common in Southern India, has not yet bee named in any work of systematic botany. I hav not yet learned any thing regarding the timber one carpenter here speaks disparagingly of it, bu I do not consider him a trustworthy authority.

9 Bauhinia tomentosa, Ains. *Leguminosæ* Caat Attic (ebony, Ains-) Tam. This like the atch marum is a strong very dark coloured wood, hence I presume, the name *ebony*. Even the younge branches show the heart-wood very dark brown the bark of this is also employed as extempor cordage. The plant furnished to me under thi name is *bauhinia racemosa*.

10 Lagerstrœmia reginæ. *Salicarieæ*, Icon 413,Cadali pua. Tam. This tree is more celebrate for its large handsome flowers than for its timbe which last however is used for common purposes

11 Terminalia Belerica, *Combretaceæ*, Ill, 91 Cattoo eloopœ marum. This is a very large tree the wood white and rather soft, and considere only fit for fuel,

12 Soymida febrifuga. *Cedrelaceæ*,Roxb, D,17, Choar kullee marum. This is the Swietenia febrifuga of Roxb, and Ainslie, I have not seen the wood and only know of its existence here from Botanical specimens of the tree brought unde that Native name. The wood is said to be most durable and strong.

13 Gmelina arborea. *Verbenaceæ*, Icon. 1470 Coominy marum, Tam. A moderate sized tree rather frequent on the Malabar coast. I do no know any thing of the timber. It is the G. Rheedi of Hooker's Bot. Magazine.

14 Putranjiva Roxburghii. *Euphorbiaceæ*. Royle's Illust. 100 Curroopallay maram, Tam. I have not seen this tree, but Roxburgh describes i as a large timber tree with an erect straight trunk The wood is white, close grained and very hard

15 Acacia sundra. *Mimoseæ*, Roxb, C. 225 Currengally maram, Tam. A rather large sized tree wood dark coloured, very strong, a one inch ba sustaining a weight of 500 lbs. it is rather abundant in the jungles here.

16 Terminalia glabra, *Combretaceæ*, Icon, 196 nearly represents this species. Curry mardah marum, Tam. A large tree, wood dark coloured very hard, heavy and strong, inch bars bearing from 430 to 450 lbs. of this large beams are readily procurable for house building purposes. See Marudum.

17 Garuga pinnata. *Terebinthaceæ*, Icon. 1594. Curry vaimboo marum, Tam. A considerable sized tree with a round umbrageous head. I am not yet acquainted with the wood.

18 Acacia odoratissima. *Mimoseæ*, Roxb, C., 120, Curry vaugay marum. A dark coloured strong and heavy wood, takes a good polish, can be obtained in considerable abundance and of good size, viz., about 1 foot square beams, is well fitted for naves of wheels, sustained 570 lbs.

19 Acacia Arabica, *Mimoseæ*, Roxb, C. 149, Curvaila marum, Under the name of Babool this

very hard wood is extensively known, but is too small for most purposes, principally used for plough shares and naves of wheels.

20 Lagerstrœmia microcarpa, *Salicarieæ*. Icon, 109, Venteak, ven bugum ? Cutchay cuttay marum, Tam. This tree attains a large size and for common purposes, where timber of inferior quality is sufficient, is very useful being easily worked. Tested by the scale it only bore 290 lbs, on a second trial however it sustained 374 lbs. were it more strong and durable the length and straightness of the stem would adapt it for spars.

21 Dalbergia sessoides. *Leguminosæ*. Eatty or vitty marum, Tam. This is perhaps the best known in our jungles of the trees yielding black wood, but there are several others as good or perhaps better. It abounds in the Palghaut forests but is rarely met with now of great size, when it and its congener Dalb. latifolia are carried to Madras it becomes one of the rose woods of the furniture shops.

22 Ficus T'siela Roxb. *Moreæ*, Icon. 668. Eichie marum, Tam. I presume, like all the other species of ficus this is of very little value as timber, the people here know nothing of it.

23 Eriodendron anfractuosum, *Bombaceæ*, Icon. 400. Elavum marum, Tam. A soft, almost worthless wood, used by Mootchee men for making toys, and such like purposes.

24 Bassia longifolia. *Sapotaceæ*, Ill. 147. Elooppæ marum, Tam. A light coloured hard and durable wood nearly equal in these respects to teak, but much smaller. Here it is much used in the construction of carts, where great strength is called for. In Malabar, where it attains a large size, it is used for spars.

Enny curray marum. See Curry vaimboo.

25 Dalbergia latifolia. *Leguminosæ*. Icon. 1156. Eroppoottoo marum. Tam. This tree seems less abundant here than the catty marum, perhaps from being more sought after as yielding more valuable timber; it is very dark, heavy and strong, sustaining a weight of 515 lbs.

26 Inga xylocarpa. *Mimoseæ*. Roxb. c. 100. Eroovaloo marum, Tam. A dark coloured, hard and very strong wood, excellent for naves of wheels and indeed for all purposes demanding great strength, I believe it is abundant in the Walliar forests. An inch bar sustained 550 lbs

Kaduki marum. Tam. See pillay murdah.

27 Euphorbia Tirucalli. *Euphorbaiceæ*. Kulli (milk hedge.) Tam. I have never seen this wood used, but have often heard it spoken of as excellent for gun stocks. To me it seems too light coloured.

28 Atalantia monophylla. *Aurantiaceæ*, Icon. 161, Kat yelloo mitch marum, Tam. A small sized tree, wood white, very fine and close grained, and but for its want of size well adapted for cabinet purposes.

29 Limonia alata. *Aurantiaceæ*, Ill. 41. Kat yelloo mitch marum, Tam. Tree small but the wood is remarkably close grained, hard and heavy. It is a pale yellow or straw coloured, if procurable of adequate size would be very valuable.

30 Casearia elliptica. *Samydeæ*. Klaare marum. Tam, This is a large shrub rather than a tree, the wood therefore can be of little value except for ornamental purposes. It is smooth, fine grained and yellow coloured.

31 Cassia fistula, *Leguminosæ*. Koannay marum, Tam. On the Eastern side of the ghauts, a small tree of great beauty when in flower, but too small to yield useful timber; in the Malabar forests, however, it attains sufficient size to adapt it for spars for native vessels. The wood, which is close grained, is used for making tomtoms, &c.

32 Zizyphus Œnoplia, *Rhamneæ*, Koattay marum. Tam. Specimens of this were brought as belonging to the class of timbers; but if used at all, it can only be for small ornamental work.

33 Eugenia jambolanum. *Myrtaceæ*: Icon. 535. Koattay naga marum, Tam. Of this wood I have no knowledge, it is said to be brittle and bad, but is described by Ainslie as fit for house building purposes.

34 Chloroxylon swietenia. *Cedre'aceæ*, Ill. 56 bis. Kodawah porsh, Tam. This is the satin wood, so highly esteemed in Ceylon where it attains a large size. Until very lately I have never seen it exceed a good sized shrub in India. I have now planks 15 inches broad from the Annamully. The wood is very close grained, takes a fine polish and is fit for all kinds of ornamental purposes. In Ceylon where it is abundant and well known, it is very highly esteemed. Their shell boxes are made of it.

Kola murdah. See villay murdah.

35 Premna tomentosa. *Verbenaceæ*, Icon. 1468. Kolcuttay Teak marum, Tam. A small tree, the wood hard and close grained, of a brownish yellow colour, well fitted for ornamental purposes.

36. Holarrhena Codaga. *Apocynaceæ*, Icon. 1292. Kooda pallei marum, Tam. A white small sized wood but very fine grained, employed in cabinet-making.

37 Gmelina asiatica. *Verbenaceæ* Ill. 174. Koomsla, maram Tam. This scarcely merits a place in this list, at least so far as I have ever seen it. The plant rarely attains the size of even a large shrub.

38 Zizyphus glabrata. *Rhamneæ*, Icon. 282. Kurkatta marum, Tam. A moderate sized tree but the timber excellent, hard, close grained and takes an excellent polish. It is of a light brownish colour. I have recently seen trees that would give 12 inch planks.

36 Mangifera Indica. *Terebinthaceæ* Maah marum, Tam. This timber seems but little used here and no wonder, since so many much better kinds are to be had for the cutting and fetching.

40 Mimusops elengi. *Sapotaceæ*, Icon. 1589. Maghidam marum, Tam. The quality of the

wood is unknown to me, and, being so much a cultivated plant, it is not probable that it is much used and is therefore little known.

41 Melia azadirachta. *Meliaceæ*, Icon. 160. Malay vaimboo marum, Tam. A soft reddish coloured, rather loose textured wood, which however takes a pretty good polish, and is much used here for cabinet-making purposes, under the name of bastard cedar.

Malay kongie (See 129 end of list) here.

42 Bauhinia acuminata. *Leguminosæ*. Mandareh, Tam. This is the B. candida Ainslie, which some botanists think a variety of koochnal (B. variegata) a larger and more common tree; both are rare here and I am not acquainted with the quality of the wood.

43 Terminalia alata (Ainslie), Terminalia tomentosa Roxb. *Combretaceæ*, Icon 195. Marudam marum, Tam. A large and useful timber tree, employed on the coast for house building and making canoes. I have not seen it in use here, it only differs externally from curry murdah in being hairy, so that the same plate serves for both species.

44 Randea dumetorum. *Rubiaceæ*, Icon. 580. Madoocarray marum, Tam. This seldom exceeds the size of a large shrub and therefore scarcely merits notice here, the wood is hard and close grained. The fruit is used in Malabar to poison fish.

45 Cratœva Roxburghii. *Cappurideæ*. Mavoolinga marum, Tam. This the Cratœva Tapia of Ainslie, not of Linnæus; I am unacquainted with the timber which Ainslie states to be used for many common purposes.

46 Briedelia spinosa? *Euphorbiaceæ*, Roxb. c. 171. Moolloo vengay marum, Tam. Wood not known here, though the tree is not uncommon and attains a considerable size in the alpine jungles.

47 Premna integrifolia. *Verbenaceæ*, Icon. 1469. Moonnay marum, Tam. A common but usually a small tree, so that the timber is only useful for common purposes.

48 Erythrina indica. *Leguminosæ*, Icon. 58. Moorkoo marum, Tam. The mootchie wood of the English; a large tree, but the wood soft and only fit for mootchie work.

49 Nauclea cordifolia. *Rubiaceæ*, Roxb. c. 53. Munja cadumbay or adumbay, Tam. A pretty, close grained, yellow wood, but soft. It is easily worked, attains a rather large size and is much used for common purposes, on trial it sustained a weight of 320 lbs.

50 Morinda citrifolia. *Rubiaceæ*. Munja pavuta marum, Tam. The wood of this tree is a deep brownish yellow and the roots are said to be used in dyeing. The quality of the wood, judging simply from the appearance, is little if at all inferior, to the preceding; but the tree is much smaller.

51 Hydnocarpus inebreans. *Flacourtianeæ*, Icon. 942. Murravuttay marum, Tam. A common tree on the west coast, not so in the Coimbatore jungles. The quality of the wood is unknown to me.

52 Ehretia ovalifolia. *Boragineæ* 1383. Naraga marum, Tam. A common but generally small tree in the Coimbatore district. I am still unacquainted with the quality of the timber said to be useless.

53 Cordea Rothii, Icon, 1379. Cordea obliqua, Icon. 1378. Cordea fulvosa, Icon. 1380. *Boragineæ*. Narvillie marum, Tam. This Tamool name seems to be applied indiscriminately to three or four species of the genus, so that it is impossible to say which is the one meant. Cordea obliqua, C. Rothii and C. fulvosa have all been brought to me under this name. I believe the wood of all is very inferior, the trees being usually small.

54 Terminalia catappa. *Combreteceæ*, Icon. 172. Nat vadom cottay marum, Tam. A beautiful tree which attains a large size in Malabar, where the wood is much esteemed, it is little known here. It is the Almond tree of the English so called with reference to the shape of the fruit, oval and flattened, but the kernel is cylindrical.

55 Eugenia caryophyllefolium. *Myrtaceæ*, Icon. 553. Naurei narvillie or nawel marum, Tam. I suspect this is the same as koattay naga above 33. This is Ainslie's Calyptranthes caryophyllifolia, and his favorable account of the timber is such, as its appearance would lead one to expect.

56 Nauclea parviflora. *Rubiaceæ*, Ill. 123. Neer cuddembay marum, Tam. This is a strong fine grained timber, sustaining a weight of 400 lbs. Beams of considerable size are procurable. The wood is dark colored and close grained, but according to Roxburgh, soon rots if exposed to wet. From the fineness of its grain it seems well fitted for cabinet purposes, and has the advantage of being easily worked.

57 Antidesma alexiteria. *Antidesmeæ*. Nolhæ talie marum, Tam. A common enough jungle tree and a very handsome one, but I know nothing of the timber.

58 Morinda citrifolia *Rubiaceæ*. Nonna marum, Tam. This is the proper Tamool name for the munjee pavuttay, see above No. 50, *Morinda umbellata* is a climbing plant, and hence unfit for use as a timber, but has the same Tamool name.

59 Guatteria cerasoides. *Anonaceæ*, Roxb. C. 33. Noolœly marum, Tam. A moderate sized tree, wood white and close grained, at least as seen in a three or four years old branch, I have not seen it as it appears in the trunk.

60 Gardenia turgida? Nunjoonda marum, Tam. I only know this from small specimens, and am unable to say whether it is a tree or shrub, but believe the former; the wood which

is hard and close grained, is useful in cases where small timber will serve.

61 Balanetes Ægyptiaca. *Rutaceæ*, Icon. 274. Nunjoonda marum, Tam. A small tree, the wood is said to be only good for fuel. These 2 trees though sent to me under the same vernacular name, are most widely different, both as regards economical qualities and botanical characters and relations. I thence infer some mistake on the part of those who gave me these names.

62 Tectona ? Oomy takoo marum, Tam, I am as yet uncertain whether to view this as a variety or distinct species of teak. Specimens tested here proved very inferior in strength to the true teak, breaking with a weight of only 300 lbs., while the other sustained above 400.

63 Stereospermum suaveolens. *Bignoniaceæ*, Icon. 1341. Padric marum, Tam. A considerable tree, frequent in the Walliar jungles, wood strong and elastic (said to be fitted for making bows), wood dark and good.

64 Artocarpus integrifolia. *Artocarpeæ*. Pillah or peela marum, (jack.) Tam. This is an excellent timber, at first yellow, but afterwards changing to brown, when made into tables and well kept, it soon attains a polish little inferior to mahogany.

65 Careya arborea. *Myrtaceæ*. Ill. 99, Pailæ marum, Tam. Wood said to be bad, the bark however furnishes a ready made cordage.

66 Wrightia tinctoria. *Apocynaceæ*, Icon. 444. Pallay marum, Tam. A common tree in the Coimbatore jungles, where it attains a considerable size, wood white and close grained; in the words of Roxb. " coming nearer to ivory than any I know." It is not however much in use here.

67 Calosanthes indica. *Bignoniaceæ*, Icon. 1337. Pana woodachie marum, Tam. Said to be a very soft and juicy wood, of no value.

68 Garcinia ? glutinifera. *Ainslie*. Panichekai marum, Tam. This is one of the very few trees admitted into this list that I have not myself seen and verified, and is introduced in the hope that some resident on the Malabar Coast, will favour me with specimens to determine its name and botanical relations.

69 Borassus flabelliformis, *Palmæ*. Panna marum, Tam. Old black wood of the palmira, is, next to that of Casuarina, the strongest I have seen tried; one specimen bore upwards of 700 lbs. and 5 of them gave an average of 648, though some were very bad.

70 Hymenodyction utile. *Rubiaceæ*, Icon 1156. Peroonjoly marum, Tam. When I first gathered specimens of this tree, I was informed that it furnished the wood called bastard cedar. This information if correct at all can only be partially so, as I have since found 2 others similarly reported, the tree attains a large size and the heart wood is red, but its qualities I have still to learn.

71 Ailanthus excelsa, *Zanthoxylaceæ*. Ill. 67, Peru marum, Tam. This tree resembles the ash in its general appearance and attains a large size. The wood is said to be hard, close grained and heavy, fit for gun stocks. I am told that in Bombay it is much used in cabinet-making, but greatly doubt the correctness of this information.

72 Terminalia chebula, *Combretaceæ*. Pilla murdah marum, Tam. This is a most gigantic tree, furnishing planks 3 feet broad. It is a dark coloured, heavy and hard wood, but very cross grained and difficult to work. It sustained about 400 lbs.

73 Calophyllum inophyllum. *Gulliferæ*, Icon. 77. Pinnay or Poonnay marum, Tam. This tree is rare at this distance from the Coast, the wood is coarse grained, but very strong and durable, and on the Coast is used in ship building. In the alpine forests, it attains a great size and furnishes the poon spars so valuable for shipping; so far as I can learn, there are two or three species of calophyllum used for the same purpose under the general name of poon.

74 Dillenia pentagyna, *Dilleniaceæ*. Pinnay marum, Tam The similarity of native names between this and calophyllum inophyllum leads me to suspect some mistake here. The wood of Dillenia pentagyna is said to be exceedingly strong and very durable even when buried under ground, but as I have not yet succeeded in getting specimens, I cannot venture to offer any opinion either as to the probability of this conjecture or the quality of the timber, which I might have done, had I seen and examined a good sample. Since this paper was written, says Dr. Wight, I have been informed that this, not the preceding, is the tree that furnishes the Poon spars, and judging from the manner of growth of the two trees I feel satisfied that this information is correct. This is a tall, the other a short stumted tree.

75. Sapindus emarginatus, *Sapindaceæ*. Poocha cottay marum, Tam, I suspect this is the same as Roxb. S. detergens. The fruit is used for the same puposes as indicated by the characteristic native name. His S. emarginatus may be a different plant as the fruit does not correspond. I do not know the wood further than that it is white, said to be only fit for fuel.

76 Bombax malabaricum. *Bombaceæ*, Ill 26. Poola marum, Tam. A large tree, but the timber soft and watery, of no value, scarcely fit even for fuel.

77 Tamarindus indica. *Leguminosæ*, Poolia marum, Tam. The wood of this well known tree is little used, perhaps from its liability to become hollow in the centre, so as to prevent good planks being obtained, it is hard, durable and finely veined.

78 Pongamia glabra, *Leguminosæ*. Icon. Poonga marum, Tam. Wood said here to be only

fit for fuel, Roxburgh on the contrary states that it serves for a variety of purposes. An oil is expressed from the seed.

79 Thespesia populnea, *Malvaceæ.* Icon. 8, Poorsung kai marum, Tam. A strong, hard, and durable timber, but rarely to be met with good, owing to the trees rotting in the heart, it grows best near the Coast.

80 Schleichera trijuga. *Sapindaceæ.* Poovoo or poo marum, Tam. Red strong hard wood, generally rather small, used to make pestles, spokes for bandy wheels and such purpose, where much strength in small space is required.

81 Nephelium longanum. *Sapindaceæ.* Poovutty marum. A moderate sized tree having a straight trunk and fine globular head. The wood is white, hard and close grained, but the carpenters here seem to be unacquainted with it.

82 Butea frondosa. *Leguminosæ* Roxb. c. 21. Porasum marum. Tam. I can get no information regarding the wood, but Roxburgh gives some most interesting information regarding the juices of the tree, as a dye and water colour.

83 Dalbergia paniculata. *Leguminosæ,* Roxb. c. 114 Putchalay marum. Tam This tree attains a considerable size, but I am as yet unacquainted with the timber. It is said to be strong and being of considerable size, is fit for many purposes.

84 Prosopis spicigera. *Mimoseæ,* Roxb, c. 63. Purrembay marum. Tam. This tree attains a considerable size and the timber is strong and hard, used for bandy wheels and other common purposes. A specimen of this wood supported 592 lbs. Is it the same as the vunny marum? The botanical specimens which accompany both, belonged to Prosopis spicigera.

85 Spathodea arcuata. *Bignoniaceæ.* Icon. 1340 Rau-pallay-marum. A medium sized tree frequent in the Walliar jungles. I do not know the wood, but judging from its relations—padre and vadeni coorne, I infer it will be found good.

86 Grewia tiliæfolia. *Tiliaceæ.* Sadachoo or chadachy marum. Tam. A considerable tree, the wood is soft and easily worked : useful for inferior building and common purposes; said to be unfit for cabinet purposes, for which in appearance it seems well adapted, on account of its hygrometric properties, which causes it to contract and expand, however well seasoned, with every change of the weather.

87 Myristica cinerea ? *Myristiceæ.* Saudikai marum. Tam. A tall straight coloured, close, even grained apparently of fine quality.

Sauvady marum. See vadencoornic.

88. Pterocarpus santalinus, *Leguminosæ.* Segapoo Shandanum marum, Tam. I do not know the wood of this tree. It is brought to Coimbatore, in small quantites, from Mysore, and sells at an extravagant price (by weight) as a dye wood. It is certainly a congener of the Vengay which furnishes much of the Malabar Kino, the texture of both is the same, the colour only differs.

89 Acacia odoratissima. *Mimoseæ,* Roxb. c. 120. Sela yoonja marum, Tam. Perhaps there is some mistake in the native name. The specimens which accompany it, are those of acacia odoratissima (curray vangy) and may not represent the true sela yoonja.

90 Elæodendron Roxburghii. *Celastrineæ,* Ill. 71, Seloopa marum, Tam. This tree is more remarkable for its fine form than the length and thickness of its bole, I do not know the wood, but if good, can only be fit for cabinet making and small sized objects.

91 Cinnamomum iners, Nees. *Laurineæ,* Icon. 122. bis, Sembela or pooli pilla, Tam. A tall tree, rather slender in proportion to its height. The wood is fine, even grained and supposed very good, but apparently has never been used by the carpenters here, as none of them are acquainted with it.

92 Sethia indica *Erythroxyleæ,* Ill. 48, Roxb. c. 88 Semboolinja marum, Tam. This I believe is the *Erythroxylon areolatum* of Ainslie, when largest it is still but a small tree. Ainslie states that the wood is so fragrant, that it is used in Mysore as a substitute for sandal wood.

93 Canthium parviflorum, *Rubiaceæ,* Roxb, c. 51, Sengaray marum, Tam. A small tree or rather moderate size shrub wood, close grained and hard, well fitted for turning small objects.

94 Santalum album, *Santalaceæ.* Roxb, C. Shandanum marum, Tam. This very valuable wood is found in abundance on the Hills which separate this district from Mysore, whence it is brought to Coimbatore for sale, its uses are too well known to require notice.

95 Semicarpus anacardium. *Terebinthaceæ,* Roxb. c. 12. Shayng cottay marum. Tam. The juice of this tree is so acrid, that wood cutters wont cut it until after it has been killed by ringing the bark. Wood reported of no value.

96 Soymeda febrifuga. *Cedrelaceæ,* Roxb. c. 17. Shem marum. This is another name for the Choar Kullie.

97 Michelia Nilagirica, *Magnoliaceæ.* Ill' 5. Icon, 938, Shemboogha marum, Tam. This tree is rare in the Walliar forests, being alpine in its tendencies. It is common on the Neilgherries, wood said to be good as regards strength, but too highly hygrometrical to be useful in other form than rafters or beams, though close and fine grained,

98 Strychnos potatorum, *Loganiaceæ.* Roxb. c, 5. Ill, 156. Taita marum, Tam. The fruit of this is the well known clearing nut. It forms a moderate sized tree, but I am not aware of the wood being used.

99 Terminalia belerica. *Combretaceæ,* Ill. 91. Roxb. c. 198. Tanikai marum or tonda marum. A large tree, wood white and soft, said by Roxburgh to be durable, but not much used. In

Ialabar it is hollowed out for canoes, which
owever are said not to be lasting. It is not un-
ommon in the Walliar jungles but is consider-
l of no value there. Perhaps the tree so called
Malabar is the Terminalia Berryi, which also
ttains a large size, and is more nearly allied to
e Curry-murdah, as belonging to the same
ection of the genus,

100 Tectona grandis. *Verbenaceæ*, Roxb. c,
, Teak marum, Tam. This is the well known and
r famed teak. As regards the strength, as shown
y the weight it is capable of sustaining, it is
iferior to several others tried here. The average
f 6 specimens was about, but under 400 lbs.

101 Capparis divaricata, *Capparideæ*. Icon.
89. Toarattie marum, Tam. A small sized tree,
ood only fit for fuel.

102 Diospyros melanoxylon. *Ebenaceæ*, Roxb,
, 46, *Toombie* marum (ebony). A very large
ee, only the very heart of which is black, all
e rest white. The white wood is however used
r common purposes.

103 Cedrela toona. *Cedrelaceæ*. Roxb. c. 238.
con 161. Toona or toon marum, Tam. A valuable
mber tree of large size, wood reddish coloured,
sed for cabinet-making purposes. It, or an allied
pecies, is known here under the name of
unjoolie marum, which see.

104 Cæsalpinia sappan, *Leguminosæ*, Roxb. c.
9, T'siapangum, Tam. Only used for dyeing.
t is cultivated in Palghaut for the purpose of
yeing the straw used in mat making.

Ulloombul marum. See. Vadencoornie,

105 Dichrostachys cinerea. *Mimoseæ*, Roxb. c.
74. Vadatala marum, Tam. A small tree or
ather large shrub, wood very hard and strong
ut too small for any except common purposes.

106 Bignonia xylocarpa. *Bignoniaceæ*, Icon.
335-36, Vadencoornie marum, Tam. A large
ee, wood brownish yellow, rather close grained,
mployed for cabinet-making, takes a good polish
turning.

107 Feronia elephantum, *Aurantiaceæ* Roxb.
. 141. Vaila marum, Tam. This is the wood
pple. The tree attains a large size and the wood
hard and durable, the only specimen tried here
ore 360 lbs.

108 Azadirachta indica, *Meliaceæ*, Icon. 17,
aypum marum, Tam. A generally diffused tree,
e wood compact and durable, used for making
rt wheels, &c.

109 Vachellia farnesiana. *Mimoseæ*, Icon. 300.
eda vully marum, Tam. Deficient in size, in
ther respects good.

110 Stercospermum chelonoides. *Bignoniaceæ*,
con. 1341. Vela pauthrie marum, Tam. Usual-
pronounced padrie marum, the flowers are very
agrant, and the tree a very handsome one,
ough not large. It is probable there is some
onfusion in the specimens, as the proper padrie
arum is reddish, and this is called the white
adrie, though the specimens seem to be the same as the other. This may easily happen as the trees are very like, being principally distinguished by the colour of the flowers, yellowish on this, brownish purple in that. Hence, perhaps, the two names, black and white pautherie. This is said to be stronger wood of the two.

111 Terminalia Berryi. *Combretaceæ*. Vellay murdah marum, Tam. This, judging from some introduced plants growing in Coimbatore, is a very large tree. The bark is quite smooth, and nearly as green as the leaves. The wood is white described as of ordinary quality, used on the Coast for canoes, and is used for making the broad wooden platters in use among fishermen and ship lascars.

112 Conocarpus latifolia. *Combretaceæ*, Icon. 994. Vellay naga marum, Tam. A tall handsome tree furnishing an excellent and very strong timber. The specimens tried here though not the best, sustained 500 lbs. Roxburgh speaks of it in very high terms.

113 Sterculea urens. *Byttneriaceæ*, Roxb. c. 24. Vellay pootallie marum, Tam. The wood of this very large tree is soft and loose grained, only fit for the most common purposes. The leaves when soaked in water have the property of rendering it ropy and glutinous. The bark yields a gum resembling gum tragacanth.

114 Capparis grandis. *Capparideæ*, Icon. 21. Vellay toarattic marum, Tam. A small tree, but the wood is close grained and hard, too small for general use.

115. Acacia leucophlœa. *Mimoseæ*, Roxb. c. 150. Vel vaila marum. A strong dark coloured wood, but generally rather small. The tree attains a medium size with a fine round head. The bark is a pale yellowish colour whence the specific name "leucophlœa."

116. Acacia speciosa or flexuosa. *Mimoseæ*. Vel vangay marum. A common tree, frequent by road sides on account of the shade its large head affords. The wood is white at least as compared with the kurry vaugay, but is very strong and durable: in our trials it bore 560 lbs.

117. Pterocarpus marsupium. *Leguminosæ*. Roxb. c. 116. Vengay marum. A large and very beautiful tree, especially when in flower, the wood is dark coloured and strong, sustaining a weight of 370 to 400 lbs., but it is said to require being kept dry. It gives out to wet lime (white wash for example) a dark rusty brown colour which deteriorates it for house building. It yields a resinous substance which is collected in large quantities in Malabar and sent to England under the name of Kino.

118. Lagerstrœmea microcarpa. Ventekoo marum. Another name for cutchay cuttay, which see.

119. Ægle marmalos. *Aurantiaceæ*, Icon. 16, Roxb. c. 143. Vilva marum, Tam. Wood said to be of no value which seems unlikely to be true

as it belongs to a family (the orange tribe) which is remarkable for excellence of its timber, barring its size, which is usually rather small.

120. Nerium antidysentericum. *Apocynaceæ.* Veppalei marum, Tam. I take this name from Ainslie, but suspect it is another name for Kooda pallie, (which see) the Linnæan name belonging to a Ceylon plant, which I have not seen on the continent. The wood is said to be excellent for cabinet making purposes.

121 Diospyros cordifolia. *Ebenaceæ,* Roxb. c. 50, Ill. 148. Vuckana marum, Tam. A hard heavy wood, colour brown, said to be very strong, but difficult to work.

122. Prosopis spicigera ? *Mimoseæ,* Roxb. c, 63. Vunny marum. Tam. The specimens brought to me under this name were not in flower, but seem quite identical with those of the purrembay; this therefore is I believe the Tamool, the other the Malayalum name. The wood, if I have not mistaken the species, is very strong (sustaining nearly 600 lbs., is hard, straight grained and easily worked), but it may be another name for currengally, the foliage of which is very like that of Prosopis spicigera.

123 Cluytea collina. *Euphorbiaceæ,* Roxb. c, 169, Woadoogoo marum. Tam. A small tree, frequent in the Walliar jungles: wood red coloured, exceedingly hard and durable but of small size: notwithstanding its hardness, being very even grained, it is easily worked, and is from its fine close grain a pretty wood.

124 Acacia catechu. *Mimoseæ,* Roxb c. 175, Wodahalay marum, Tam. Said to be only fit for fuel. This surprises me as the woods of all the other arboreous species of the order (Mimoseæ) are proverbial for their excellence.

125 Acacia amara. *Mimoseæ,* Roxb, c, 122. Woonja marum, Tam. A pretty large tree, but of rather low stature : the wood dark coloured and hard. I have not yet had an opportunity of properly examining it.

126 Cedrela toona. *Cedrelaceæ,* Icon, 161, Wunjoolie marum. A very heavy and strong wood, hard, said to be admirably fitted for pestles and mortars and other purposes demanding great strength, but not for cabinet purposes ; whence I suspect Roxburgh's toona and our Wunjoolie are different trees.

127 Zizyphus jujuba, *Rhamneæ,* Icon. 93, Yellanday marum, Tam. Tree usually of small size, but the wood fine grained and hard, fitted for cabinet-making purposes.

128 Strychnos nux vomica, Roxb, c, 4 *Loganiaceæ,* Icon, 434, Yetti marum, Tam. A small tree, wood white and hard, much used, when procurable, for Native plough shares.

129 Cullenea excelsa, *Bombaceæ,* 1761, Malay konjie marum, Tam. A very large and tall tree, trunk straight, from 60 to 80 feet high. Wood white, rather open grained, apparently not very good, but the outside sap-wood only was examined. Under the microscope its longitudinal section is very peculiar ; altogether such as I have not elsewhere observed,

130 Rhus?—Sp? *Terebinthaceæ.* Coongilliya marum, Tam. This is the chloroxylon dupada of Buchanan and Ainslie. An undescribed name and judging from the leaves, one not required, which are clearly those of a rhus very nearly allied to Roxburgh's R. Bucki-amela but distinct. The qualities of the timber is unknown. The outer sap-wood is white, fine grained and heavy, apparently very good.

131. Vitex altissima. *Verbenaceæ,* Icon. 1466 Kat miella marum. This is a large tree, frequent on the lower slopes of the ghaut mountains, but I am not acquainted with the timber except in so far as can be learned from a small outside specimen which seems close grained. It is reported fit for cabinet purposes.

132 Canthium nitens? *Rubiaceæ.* Malay canray, Tam. The wood of this, like that of the preceding, is unknown to me. The plant is described as a small tree. I only know it from the specimens which accompanied the name, but which were not accompanied with timber.

133 Hymenodyction obovatum. Icon 1159, Yella malakai marum, Tam. A tree, but I am unacquainted with its dimensions or quality of the wood ; no specimens having been sent.—*Robert Wight.*

(8201) *Ganjam, Goomsoor, and Kimedy Forests, their timber trees, Timbers and Fancy-woods.*

Several lists of the trees of these forests are in our possession, but the most recent and valuable are from Lieutenant Macdonald from Ganjam and Lieut. Philipps from Kimmedy. In a memorandum which accompanied the list of Ganjam woods it is mentioned that the forests in the northern portion of the district of Ganjam, although not to be compared in size or importance with those in some other parts of the Madras Presidency are nevertheless somewhat extensive and contain many useful trees.

The most important and accessible of these forests are situated in the talook of Goomsur and the Zemindary of Bodogoda both of which are watered by rivers which afford facilities for floating the timber down to the coast during the freshes. The Jungles change their names every two or three miles and a list of them would be so long that it seems sufficient to indicate in general terms the localities in which the largest and finest timber is procurable. In Goomsur these are the Kookooloobah, Gullery, Ootorogodoloto, Poorwagoodoloto, Juggurnauthprasaud, Kureholy, Bhootapilly and Beerceota Mootahs. In Bodogoda there are three Mootahs below the Ghauts, the Coradakonna, Godo and Jagiree, all three of which are well wooded, but the first contains the largest forests. Above the ghauts are the Mootahs of Jorraow, Gowdogoho, Morihano, Gokalopoor, Meerecote, Woddobah and Lohagooddee all abounding in timber, which remains uncut chiefly on account of the difficulty of transporting it.

The same remark applies to the forests of Chokapaud and Poomaghur, two hill dependencies of Goomsur. In the former the Cottarikiah, Woollingiah, Mettribiah and Koondopottro Mootahs contain forests which are of little use to any one except the inhabitants of the country —of these forests the largest are the Dodosoroo, Dehenkosoroo, Jhoondasoroo and Saboolodeyee. In the Hill tracts under Poomaghur for the same reason, but little use is made of any of the forests with the exception of those in the Punchagodotolo Mootah which lies at the foot of the ghauts.

I am not in possession of any returns from Soorada, but I know from personal observation that this small talook is most extensively wooded and that it supplies large quantities of fire-wood to the Aska factory, the sum paid for this single item being, I have been given to understand, equal to one third of the revenue collected from the Talook. It is noted for its extensive tamarind topes and orange groves but in other respects probably differs but little from the neighbouring talooks.

Bodogoda is a Zemindary but the Rajah being a minor is at present under the management of Government. The forests belong to the Zemindar, in whose name a variety of small taxes are levied on the products of the jungle. Their amount is however very insignificant and the privilege of collecting them is farmed out to a renter who is styled "Ghoto Bissoye," "Bono Bissoye" and "Bono borilla," (Jungle-ranger), which last name is expressive of the nature of his ordinary duty. He paid this year Rupees 84 for his farm and levies a small sum varying from 4 annas to a Rupee from each village for the general privilege of cutting fire-wood, a tax of 2 annas on every new bandy, of one Rupee on every new boat, of R. 1-8-0 on every tree cut down for a mast, half an anna on every bandy load of fire-wood, 1 anna on every bandy load of bamboos, 2 annas and 6 pice on every bandy load of plank wood, and similar small sums for wood required for ploughshares, oil presses &c. There is also a Zemindary tax termed Pohondee Ghuttum, levied on all sales of honey, rosin, Arrow root, Moholo flowers, Moholo seeds, and Korunjo seeds, but in Bodogoda this tax has apparently merged in the farm of the forest renter.

In Goomsur and the other tracts alluded to, which are all Government talooks, no such taxes are known, and although the forests are almost without exception, Government property, no revenue whatever is derived from them. In the time of the Goomsur Rajahs, it is said that a tax called Bono Cowry of 2 annas was levied on each plough, and that altogether the forests yielded a revenue of about Rupees 2000 a year, but these taxes have been abolished.

Throughout the whole of this part of the District, there is far more timber than is required for the local consumption, but there is no doubt that with the exception of the Hill Tracts, the jungles are all rapidly diminishing—partly owing to the increase of cultivation and partly to meet the demand for timber at Aska, Berhampore, Ganjam and other places. In the time of the Rajahs the felling of timber was systematically discouraged from motives of policy with a view to render the country less accessible to troops. With the exception of an order recently issued by the Collector forbidding the indiscriminate cutting of timber there is at present no system of any kind regarding the felling or the reproduction of trees.

Timber is cut at all times of the year, but most of it seems to be felled between January and May, these being the months during which the Ryots are less occupied with their cultivation. Bamboos and other trees which have little or no heart wood, are cut during the wane of the moon being otherwise, it is said, liable to be attacked by insects, but there is no such belief with regard to the larger kinds of timber. There are however five days in each Hindoo month, which are supposed to be inauspicious and on these no trees are felled.

Large patches of jungle are constantly cleared for the purpose of being brought under cultivation and the destruction of the trees is often, and on the hills it may be said always, effected by fire. This destruction is however not altogether indiscriminate, certain trees being always carefully preserved. Among these are the Mango and date tree, the koeto, the Bovadah and Soondorogoondee, to which, if the cultivators are Khonds, may be added the Solopo palm and the Mohollo, which are especially reserved from destruction on account of the intoxicating liquors which they yield.

Annexed is an imperfect list of the forest trees in this part of the country with their dimensions and remarks on the use to which they are generally applied, followed by a list of the prices of timber and other vegetable products. None of these seem to be subject to any kind of regulation, and it has not been possible to ascertain the extent of traffic which is carried on in them. No exotic trees of any kind have as yet been introduced.

The wild Animals of the country are tigers, black panthers, common panthers, cheetahs, hyenas, jungle cats, bears, elk, spotted deer, bison, neelghye, wild hog, jungle sheep, wild dogs, porcupines, hog deer, and two kinds of monkeys.

R. M. MACDONALD,
Assistant Agent

Asst. Agent's Office, Russellcondah, 4th Dec. 1854.

Lieutenant Phillips believes that the Kimedy forests cover to the extent of 400 square miles, those of chief consequence and most accessible, lying on both banks of the Vremshadara river, above and below "Butteley," "Barsinghy," Jeranghee ; Jeranghe, Giba, Cothoor, Jadoupully and indeed the whole of the hilly tracts abound with fine trees, the only difficulty being their removal when cut. He particularly notices a tree, the "Dhamono," or "*Kurkurra.*" Its extreme height is 39 feet. The circumference its trunk is 3½ feet, and height from the ground to nearest branch 18 feet. It furnishes a very long grained tough wood, plant and light. It is used for dhoolies, cots, bandy wheels, and poles, spear and axe handles, fishing rods and lance handles and other purposes where strength and elasticity are required.

(8202) *Ganjam and Goomsoor.*

1 Salwa or Sorunghee. Extreme height 90 feet. Circumference 6 feet. Height from ground to the intersection of the first branch, 33—38 feet. This is the well known saul or dammer tree and is one of the commonest as well as one of the most useful trees in these jungles. It is used for beams, rafters, posts and for almost every description of wood work required in house building ; it is made into masts for native dhonies, is used for bandy wheels and ploughshares and has recently been exported in large quantities to supply the demand for Railway sleepers. The large logs are cut into planks for doors, windows and other purposes. The branches and less useful portions of the tree are burnt for firewood and for charcoal. The tree before being used is usually stripped of its bark ; it is then designated Jhora or Jhangherree and is not liable to be attacked by white ants. A well known rosin (bdellium) termed here Jhoona or sodaloso exudes from the tree when it has attained a large size. This is burnt at the shrines of all the Village goddesses, is used by native jewellers for filling up the hollow portions of ornaments, and is in great request among ship owners and boatmen for their vessels. The leaves of this tree are used for eating rice out of. The seeds are used medicinally and are said to have an astringent property. They are also boiled, dried and pounded into a sort of rice, which is eaten by the Khonds and poorer classes of Oriyas in times of scarcity. This tree abounds every where, the largest specimens are to be found in the Goomsur forests, but the timber of Bodogoda appears to be more highly prized in the native market, not, it is said on account of any intrinsic superiority in the wood, but because large quantities of a uniform size are more easily procurable in that zemindary. It forms an important article of traffic in Bodogoda, large quantities of it being annually floated during the rains down the Jhoroo and the Patna towards Soorada, and thence, after the junction of these streams with the Kooshkoolliah, to Aska, Pitala and Ganjam, besides which a considerable quantity of timber is carried on bandies to Shergoda, Coorlah and Berhampore.

2 Piasalo. Terminalia alata. Buchanania latifolia. Extreme height 90 feet. Circumference 6 feet. Height from ground to the intersection of the first branch, 22 feet. This is also a most useful wood and is in great request for doors, windows, boxes and also for house building. It is also used for the flooring of cattle sheds. The supply is hardly equal to the demand and the tree is getting scarcer than it was.

3 Sisoowa. Dalbergia sissoo Extreme height 45 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 15 feet. This is the material of which tables, chairs, couches, bookstands and other articles of furniture are usually made in this part of the country. It is not so plentiful as it was being in great request. The wood yields a very useful oil.

4 Kendhoo. Extreme height 60 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 30 feet. A hard wood blacker than the Sisoowa. Boxes &c. are made of it. It is tolerably common. The fruit is eaten.

5 Gombharee. Extreme height 50 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 18 feet. A white light wood. Boxes, chairs, bedposts, lamp stands, bullock yokes, bazar measures, toys and other articles are made of it. It is rather scarce and expensive. The bark is said to be used medicinally.

6 Holondho ? Extreme height 75 feet. Circumference 7 feet. Height from ground to the intersection of the first branch, 36 feet. This wood on account of its size and lightness is used for boats which are made of a single log of it by simply scooping out the inside and afterwards shapened in a rough manner. It is also used for the masts of native Dhoneys, and bazar measures, and is cut into planks and made into doors, boxes &c. It is getting scarcer than it was but is still tolerably common.

7 Jamo Myrtus cyminum ? Eugenia Jamboo ? Eugenia Jambolana. Extreme height 75 feet. Circumference 7 feet. Height from ground to the intersection of the first branch, 36 feet. This is also used for making boats in the same way as the Holondho. Doors, ploughshares and troughs for cattle are made of it. The fruit is eaten. The bark is used medicinally in diarrhœa &c. The tree is not very common either

in Bodogoda or lower Goomsur, but is said to be rather plentiful in the Chokapand forests. There are two species termed respectively the "Bodo" and "Coojee" Jamo.

8 Solm. Coronilla sesban ? Coronilla picta ? Extreme height 50 feet. Circumference 6 feet. Height from ground to the intersection of the first branch, 12 feet. A very heavy wood and of great strength. It is almost exclusively reserved for making posts for pagodas and sacred edifices, the use of it in ordinary house building being it is said forbidden in the shastras. The tree is very common, but owing to this superstition very little use is made of it, the only purposes to which the wood is applied being for making rice pounders and the wooden stands on which the large grain baskets used in this part of the country, are placed. The bark is used for tanning skins and also medicinally by women after childbirth, a sort of fungus or excresence from this tree is applied externally to wounds and sores and is also taken internally in colic and affections of the stomach.

9 Bodoka. Extreme height 35 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 15 feet. A light, white wood, used for scabbards, bazar measures, boxes, bullock yokes, the poles of palanquins and tonjins and for toys. It is tolerably common.

10 Ponoso. This is the common jack tree and does not therefore require to be described. It is not very plentiful.

11 Jhoontiah. Extreme height 45 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 15 feet. A hard, white wood, used chiefly for making hair combs and small boxes. It is tolerably common.

12. Koossoomo. Extreme height 50 feet. Circumference, 4½ feet. Height from ground to the intersection of the first branch, 9 feet. A remarkably hard, heavy wood, and used on that account for oil presses, sugar crushers, and the axletrees of bandies. The tree yields a lac which is in request among native jewellers, an oil used for burning is extracted from the seeds. There are two species of this tree, the "Kola" and the "Ghuntiah" Koossoomo. The former abounds and is large and more useful than the other, which is not so common.

13. Moondomonde. Extreme height 60 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 22 feet. This wood is used occasionally for beams, planks &c. but is not in much request and the tree is not very plentiful.

14. Orjoono. Terminalia alata ? T. glabra ? Extreme height 100 feet. Circumference 8 feet. Height from ground to the intersection of the first branch, 36 feet. This is used for making boats in the same way as the Holondho and Jamo. The tree is not very common in Goomsur but abounds in the forests of Bodogoda.

15. Mohoollo. Bassia latifolia ? Extreme height 15 feet. Circumference 8 feet. Height from ground to the intersection of the first branch, 36 feet. This is also used for boats and the flooring of cattle sheds is often made of this wood, this tree is highly prized by the Hill tribes on account of the intoxicating liquor which they distil from its flower. The latter is made into a sort of sweetmeat by the Oriyas, who mix sugar and rice with it. The fruit in its unripe state is boiled and eaten as a vegetable. The fruit yields an oil termed "Jolo Jelo," this is purchased by the bukals for the purpose of adulterating ghee, which it somewhat resembles in appearance. This tree and the Solopo palm are never destroyed by the koonds when they clear a patch of jungle for the purpose of bringing it under cultivation, and in the time of the Goomsur Rajahs, the rebellion of any of the Hill tribes was often punished by cutting down all their Mohollo and Solopo trees.

16. Achoo. Extreme height 36 feet Circumference 2½ feet. Height from ground to the intersection of the first branch, 10 feet. A light, hard wood, of which the stocks of all the Oriya matchlocks is made. A pink dye is extracted from the root. It is not very common.

17. Ambo. This is the common mangoe tree and requires no description.

18. Kodalo. Extreme height 39 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 8 feet. A light wood used for planks, doors, boxes and scabbards; it is also used for firewood, being tolerably plentiful.

19. Mahalimbo. Extreme height 70 feet. Circumference 5 feet. Height from ground to the intersection of the first branch, 22 feet. This wood is not liable to be attacked by insects, and is on that account used for making boxes &c. The fruit and bark are used medicinally for fever and rheumatism. The tree is tolerably common.

20. Limbo. Melia Azedirachta ? Extreme height 70 feet. Circumference 5 feet. Height from ground to the intersection of the first branch, 22 feet. This is the margosa tree. Idols are usually made of this wood because it is not liable to be attacked by insects. The bark is used medicinally for fever, small pox, and worms. An oil which is extracted from the seeds of this tree, is used for itch and other cutaneous diseases. The tree is tolerably common and is burnt for firewood.

21. Soroopottree Moec. Extreme height 40 feet. Circumference 2½ feet. Height from ground to the intersection of the first branch, 18 feet. Used for planks, doors, boxes, posts, and ploughshares. It is tolerably common.

22. Siddha. Extreme height 45 feet. Circum-

ference 4 feet. Height from ground to the intersection of the first branch, 22 feet. This wood is not liable to be attacked by insects. It is used chiefly for making rafters of and is burnt for firewood, being rather plentiful. The bark and leaves are employed in tanning leather and are also used medicinally.

23. Sahajo. Extreme height 60 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 30 feet. This is one of the commonest trees in these jungles, Cattle sheds are sometimes floored with this wood and rice pounders are also said to be occasionally made of it, it is extensively used for firewood and for making potash. The bark is used for tanning.

24. Kaloochia. Extreme height 25 feet. Circumference 2½ feet. Height from ground to the intersection of the first branch, 12 feet. Used for posts and ploughshares and burnt for firewood. It is not a common tree.

25. Banjhono. Extreme height 45 feet. Circumference 5 feet. Height from ground to the intersection of the first branch, 22 feet. Used for bandy wheels on account of its strength. It is rather scarce.

26. Dhamono. Extreme height 35 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 20 feet. Used for cot frames and bandy wheels; the handles of axes, knives, spears, momoties, pickaxes and carpenter's tools are made of this wood, which is also burnt for firewood, being tolerably plentiful.

27. Kosee. Extreme height 50 feet. Circumference 4 feet. Height from ground to the intersection of the first branch, 22 feet. Used for posts, door frames and rafters and burnt for firewood, being tolerably plentiful.

28. Janghany. Cassia Auriculata? Extreme height 40 feet. Circumference 3 feet Height from ground to the intersection of the first branch, 18 feet. Used for posts and rafters, and burnt for firewood. It is tolerably common in Bodogoda, but seems to be scarce in Goomsur.

29. Gouharea. Extreme height 45 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 15 feet. A wood of great strength and used on that account for sugar crushers, bandy wheels, ploughshares and rice pounders. The bark is used for tanning skins. The tree being tolerably common is burnt for firewood.

30. Pitta Kaloochia. Extreme height 36 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 15 feet. Used for the same purposes as the kaloochia (Vide No. 24) but is a larger tree and very plentiful.

31. Khoiro. Mimosa catechu? Extreme height 25 feet. Circumference 2 feet. Height from ground to the intersection of the first branch, 6 feet. Used on account of its strength for sugar presses, and rice pounders. The wood is burnt when libations are offered. The gum is mixed with betel nut and gives a red colour to the spittle. This is I believe generally known under the name of Catechu.

32. Dhobo Khoiro. Extreme height 25 feet. Circumference 2 feet. Height from ground to the intersection of the first branch, 6 feet. A white variety of the same species. Both trees are very common.

33. Minjharee or Paloodhona. Extreme height 45 feet. Circumference 5 feet. Height from ground to the intersection of the first branch, 6 feet. Used on account of its lightness for rafts also for pacottah poles. The fruit and flower are both eaten. The bark and leaves are used medicinally for worms. The tree abounds.

34 Tentoollee or Koyan. This is the common tamarind tree and calls for no remark.

35 Sirisee. Mimosa Serissa? Extreme height 30 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 22 feet. Used for sugar crushers, pestles, mortars and ploughshares. It is tolerably plentiful.

36 Boro. This is the common banian tree and calls for no remark.

37 Phasee. Extreme height 60 feet. Circumference 6 feet. Height from ground to the intersection of the first branch, 30 feet. A light hard wood, used for sugar presses, rice pounders, and bandy wheels, and occasionally for making boats of. It is tolerably plentiful.

38 Oshrosto. This is the ficus religiosa and calls for no remark.

39 Dhoon, Extreme height 45 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 22 feet. This tree abounds and is extensively used for fuel. The wood is of little value.

40 Koombee, Bauhinia spicata? Extreme height 36 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 6 feet. A light, white wood, used for bullock yokes. The common match used by the Oriya matchlock men is a rope made of the fibre taken from the bark of this tree; it is said to be used for this purpose because it burns for a long time. The scanty substitute for ordinary clothing used by Byragees. Visnovas and other persons affecting peculiar sanctity is made of the bark of this tree. It is said to be also used medicinally. The tree abounds.

41 Bouro. Bombax heptaphyllum. This is the common silk cotton tree and calls for no remark

42 Baelo. Extreme height 30 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 15 feet. This wood is sometimes employed for making bandies, but it is chiefly used for firewood the tree being extremely common, the leaves are used for making

sort of umbrellah which is worn on the head y the ryots and coolies in this part of the counry.

43 Soondorogoondee Koomalagoondee or Bosontogoondee Extreme height 15 feet. Circumerence 2½ feet. Height from ground to the ntersection of the first branch, 5 feet. The ruit of this tree yields a valuable dye which is xtensively used for dyeing silk &c and is exportd in large quantities to Calcutta and other laces. It is very expensive and is eagerly bought up by the Mahajuns who send their Gumashtahs to purchase it of the Khonds. The ree is very scarce in many parts of Goomsur but s tolerably common in any of the frontier Mooahs such as Juggernathprasaud, Kurcholy and Coocooloobah. It is found in greater abundance n the Bodogodo Jungles, and is said to be tolerbly plentiful about Chotapaud, but is far more common on the Bengal side of the frontier and is aid to abound in Boad and Duspullah.

44 Korunjo. Galedupa arborea Extreme eight 36 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 22 eet. The tree is very common, but no use seems o be made of the wood except for firewood ; an il extracted from the fruit is used medicinally for tch and other cutaneous diseases and is also mployed as lamp oil.

45 Soogondhee Ocimum Caryophillatum? Periploca indica ? Extreme height 25 feet. Circumference 2 feet. Height from ground to he intersection of the first branch, 7 feet. This tree is tolerably common but no use is made of the wood except for firewood, the leaves are used medicinally for rheumatism and wounds of long standing.

46 Bhayroo Swietenia chloroxylon. Extreme height 40 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 20 feet. Used for axletrees, oil presses, posts, bed posts, rafters and the handles of axes. It is also burnt for firewood, and for charcoal. The leaves are applied to wounds. The tree is not so common in Goomsur as in Bodo godo, and it is said to be still more plentiful in Mohery and other alooks to the South.

47 Bello. Ægle Marmelos. Extreme height 30 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 10 feet. The wood of this tree is mixed with water and ground into a sort of oily paste, which is poured on the lingum in the temples dedicated to Siva. The leaves are offered to Siva and to the female divinities n the same way that the leaves of the Toolsee are offered to Vishnoo. The fruit is eaten and the juice of it is used in making chunam.

48 Borokolee. Zizyphus jujuba. Extreme height 30 feet. Circumference 3 feet. Height from ground to the intersection of the first branch 8 feet. Planks, doors, boxes, matchlock stocks, and Palanquins are made of this wood. The leaves pounded and mixed with turmeric are supposed to be efficacious in curing rheumatism. The seeds are also used medicinally in diseases of infants. The tree yields a lac. The large trees are scarce but young trees are very common.

49 Ollakolee. Emblic Myrobalan Phylanthus Emblica. ? Extreme height 40 feet. Circumference 4 feet. Height from ground to the intersection of the first branch, 15 feet. No use seems to be made of this wood, but the fruit is pickled and the bark is used medicinally.

50 Moee. Extreme height 30 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 13 feet. Stakes are cut from this tree and planted in hedges where they spring up again. The bark is used in tanning leather. The tree abounds.

51 Behenta. Extreme height 30 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 10 feet. Used for Axletrees, oil presses and rice pounders. It is also burnt for fire-wood the tree being very common. The bark and leaves are used medicinally.

52 Korada. Extreme height 30 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 8 feet. A light wood, used for rafters, spinning wheels and door frames. It is also burnt for fire wood the tree being very common. The leaf is used medicinally for itch. The bark of this tree is poisonous and a preparation of it is often used for the purpose of destroying life, particularly by Oriya widows among whom suicide is a frequent occurrence.

53 Dhobee. Extreme height 36 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 15 feet. There are two species of this tree, the " Nongoliah" and the " Pooro," both of which are very common. It seems to be only used for firewood.

54 Charo. Buchanania latifolia. Extreme height 36 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 15 feet. This tree abounds. Bullock yokes are sometimes made of the wood, but it is chiefly used for firewood.

55 Poecchandea. Extreme height 48 feet. Circumference 5 feet. Height from ground to the intersection of the first branch, 9 feet. Ploughshares are occasionally made of this wood, but it is chiefly used for firewood. The rosaries worn by Byragees and Vishnoos are made of the seeds of this tree.

56 Gronhonee Kubatee. Extreme height 80 feet. Circumference 6 feet. Height from ground to the intersection of the first branch, 12 feet. The platform of the cars used at the Juggurnauth festival is often made of this wood, but it is chiefly used for firewood being

tolerably common. The bark is said to be used medicinally for diarrhœa.

57 Horedha. Terminalia Chebula ? Extreme height 45 feet. Circumference 4½ feet. Height from ground to the intersection of the first branch, 20 feet. Used occasionally for beams and rafters but chiefly for firewood, the tree being tolerably plentiful. The bark is said to be employed in tanning and the fruit to be used medicinally. The fruit yields a black dye.

58 Bahadha. Terminalia Belerica ? Extreme height 50 feet. Circumference 4 feet. Height from ground to the intersection of the first branch, 10 feet. A tolerably common tree but the wood is said to be of no use. The fruit is used medicinally.

59 Soonaree, Cassia fistula ? Extreme height 36 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 10 feet. A tolerably common tree. Ploughshares and rice pounders are occasionally made of this wood, but it is chiefly used for firewood. The fruit is used medicinally. Bears are particularly fond of it.

60 Bhallcah, Semecarpus Anacardium. Extreme height 40 feet. Circumference 4 feet, Height from ground to the intersection of the first branch, 20 feet. A tolerably common tree, but no use seems to be made of the wood except for firewood. The nuts are eaten—an oil extracted from the nuts is applied to the sores of cattle and also used for rheumatism. The fruit yields a black dye.

61 Dhimeree, Ficus glomerata ? Ficus guleria ? Extreme height 40 feet : Circumference 4½ feet Height from ground to the intersection of the first branch, 8 feet. Bandy wheels are sometimes made of the wood, but it is chiefly used for firewood, being tolerably plentiful. It is considered sacred and is burnt when libations are offered. The fruit is eaten : a juice extracted from the root is used for rheumatism.

62 Boincho Flacourtia sapida ? Extreme height 15 feet. Circumference 1 foot. Height from ground to the intersection of the first branch, 5 feet. A common tree only used for firewood. The fruit is eaten. This wood is burnt when libations are offered for a person who has died on an inauspicious day.

63 Choonokolee. Extreme height 10 feet. Circumference 1 foot. Height from ground to the intersection of the first branch, 5 feet. A common useless tree. The fruit is eaten.

64 Brahmonea. Extreme height 15 feet, Circumference 1½ feet. Height from ground to the intersection of the first branch, 7 feet. The bark is said to be used medicinally, but the wood is useless.

65 Sahadha, Trophis aspera ? Extreme height 30 feet. Circumference 2 feet. Height from ground to the intersection of the first branch, 6 feet. Bandy wheels and tooth brushes are sometimes made of this wood, but it is chiefly employed for firewood being very plentiful. The bark is used medicinally, the leaves and sap are used for wounds and for a disease of the eye termed in Oriya Jokia, said to be peculiar to children.

66 Gotho. Extreme height 20 feet. Circumference 2½ feet. Height from ground to the intersection of the first branch, 7 feet. Useless except for firewood.

67 Gondhona Phyllanthus emblica ? Extreme height 25 feet. Circumference 7½ feet. Height from ground to the intersection of the first branch, 6 feet. There are two varieties of this tree, termed respectively the " Gona" and the " Moinsea" Gondhona. The leaves are boiled and eaten as a vegetable. The bark is used medicinally. The common mode of obtaining fire in the jungle is by rubbing two pieces of this wood together. The tree is tolerably common, but the wood is only used for firewood.

68 Rayee. Extreme height 30 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 15 feet. Tolerably plentiful, but only used for firewood.

69 Ankoolo Alangium Hexapetalum ? Extreme height 30 feet. Circumference 2½ feet. Height from the ground to the intersection of the first branch, 12 feet. The leading bull in a herd of buffaloes has a sort of wooden bell called " Lodoko" attached to its neck. This is heard at a great distance in the Jungle and is always made of this wood, which is said to be peculiarly adapted for producing sounds. The wood seems however to be of no other use except for firewood. The root is used for snake bites.

70 Patonwa. Extreme height 20 feet. Circumference 1 foot. Height from ground to the intersection of the first branch, 5 feet. Used chiefly for firewood being tolerably common. The fruit thrown into a pond of water kills all the fish in it and is used for that purpose by the keyouts (fishermen). This mode of catching fish is designated " Macho Mohoneebaro." The fruit is said to be poisonous, but the seeds are used medicinally for fever.

71 Ambaleta. Extreme height 12 feet. Circumference 1½ feet. Height from ground to the intersection of the first branch, 3 feet. The juice of the leaves is mixed with Mercury and taken internally for rheumatism and other diseases.

72 Kotoko. Strychnos potatorum ? Extreme height 40 feet. Circumference 4 feet. Height from ground to the intersection of the first branch, 9 feet. Chiefly used for firewood, though bandy wheels and ploughshares are occasionally made of this wood. The seeds have the curious property of purifying muddy water, and are constantly used for that purpose by the natives who rub the inside of their lotas and brass pots with them. They are also used for killing fish in the same way as the fruit of the Potonwa. The fruit is used medicinally.

73 Porto koorwan. Extreme height 20 feet. ircumference 1 foot. Height from ground o the intersection of the first branch, 5 feet. hiefly remarkable on account of its seeds, called ere Indrajebho, which are used medicinally and eld in great estimation. The juice of the leaves given to young cattle to destroy worms. The ark is also used medicinally. The tree abounds.

74 Patolee. Bignonea Suaveolens? Extreme eight 20 feet. Circumference 1½ feet. Height om ground to the intersection of the first ranch, 12 feet. The bark is employed medici-ally. No use seems to bemade of the wood. he tree is not very common.

75 Pamphoonea. Bignonia chelonoides? Exeme height 20 feet. Circumference 1 foot. leight from ground to the intersection of ie first branch, 8 feet. The bark and fruit re employed medicinally, but no use is made of he wood.

76 Nooniaree, Looniaree or Noonononea. Exeme height 36 feet. Circumference 4 feet. Height om ground to the intersection of the first ranch, 7 feet. A common tree, chiefly used or firewood though ploughshares are occaionally made from this wood. The bark is mployed medicinally in fever.

77 Gooroohado. Extreme height 22 feet. ircumference 2 feet. Height from ground o the intersection of the first branch, 10 eet. Chiefly used for firewood though rafters re occasionally made of this wood.

78 Hinjolo; Eugenia acutangula? Extreme eight 30 feet. Circumference 4½ feet. Height om ground to the intersection of the first ranch, 6 feet. Grows in abundance on the anks of rivers. The wood is not affected by amp, and is therefore generally used for the ooden frame work at the bottom of wells. Rice ounders are also made of it. The bark is iven medicinally to women after childbirth.

79 Lodhoka sijhoo Euphorbia Tirucalli? Exreme height 20 feet. Circumference 2 feet. Height rom ground to the intersection of the first ranch, 6 feet. Not common. It is said to yield sort of milk which is made into a cataplasm nd applied to boils &c. It is also used for killing sh by the keyonts.

80 Salora. Extreme height 22 feet. Circumerence 1 foot. Height from ground to the inersection of the first branch, 5 feet. A comion tree only used for firewood. The leaves are aten.

81 Khakodha. Extreme height 30 feet. Cirumference 2 feet. Height from ground to the ntersection of the first branch, 9 feet. A comnon tree only used for firewood.

82 Khookoondea. Extreme height 30 feet. ircumference 2 feet. Height from ground to the ntersection of the first branch, 9 feet. A comnon tree only used for firewood.

83 Killakooroowan. Extreme height 20 feet. Circumference 1 foot. Height from ground to the intersection of the first branch, 6 feet. The fire sticks used by the shikarees for night hunting are taken from this tree. It also yields an oil which is applied to the sores of cattle. The tree is common.

84 Koeto Feronia elephantum. Extreme height 50 feet. Circumference 5 feet. Height from ground to the intersection of the first branch, 10 feet. Bandy wheels are sometimes made of this wood. The tree is not very common. The fruit is eaten and the gum which this tree yields is much used.

85 Mosanea. Extreme height 15 feet. Circumference 2½ feet. Height from ground to the intersection of the first branch, 4 feet. Not very common. The bark is used medicinally for wounds and sores. The wood is useless except for firewood.

86 Gongosheolee Dondeepoholo. Extreme height 25 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 7 feet. No use seems to be made of the wood. The flower which has a powerful perfume is offered in all the pagodas to the presiding divinity.

87 Pendoora. Extreme height 20 feet. Circumference 2 feet. Height from ground to the intersection of the first branch, 1 foot. The fruit is eaten and the bark used medicinally. The wood is useless except for firewood.

88 Ambhota. Extreme height 20 feet. Circumference 2 feet Height from ground to the intersection of the first branch, 7 feet. Useless except for firewood.

89 Kopassea. Extreme height 20 feet. Circumference 2 feet. Height from ground to the intersection of the first branch, 7 feet. Useless except for firewood.

90 Potoobaolo. Extreme height 45 feet. Circumference 4 feet. Height from ground to the intersection of the first branch, 12 feet. Occasionally used for bandy wheels and ploughshares. The leaves are eaten as a sort of vegetable by the Hill people. Tolerably common.

91 Joree. Extreme height 60 feet. Circumference 5 feet. Height from ground to the intersection of the first branch, 8 feet. Bandy wheels are occasionally made of this wood, which is also burnt for firewood. The seeds are eaten by the Khonds. The tree is tolerably common.

92 Chochena. Extreme height 60 feet. Circumference 5 feet. Height from ground to the intersection of the first branch, 9 feet. Chiefly used for firewood, the tree bring tolerably common. The bark is used medicinally in fever. The milk is given medicinally to children in a disease called "Doobellee."

93 Bokmo, Cæsalpinia sappan. Extreme height 36 feet. Circumference 2 feet. Height from

ground to the intersection of the first branch, 8 feet. The common powder used at the Holee festival is extracted from the wood of this tree. It is not very plentiful.

94 Ghunteoh Patoolee. Extreme height 22 feet. Circumference 1½ feet. Height from ground to the intersection of the first branch, 10 feet. Used occasionally for axletrees and rafters but chiefly for firewood, the tree being rather common.

95 Chorayegodee. Extreme height 22 feet. Circumference 1½ feet. Height from the ground to the intersection of the first branch, 6 feet. Used for firewood.

96 Amboodha spondias mangifera ? Extreme height 30 feet. Circumference 2½ feet. Height from the ground to the intersection of the first branch, 7 feet. Used for firewood. The fruit is eaten. Tree tolerably common.

97 Kontabaolo. Extreme height 30 feet. Circumference 2 feet. Height from the ground to the intersection of the first branch, 7 feet. The tree abounds and is chiefly used for firewood, though ploughshares are occasionally made of the wood. The bark is used medicinally.

98 Borodha. Extreme height 30 feet. Circumference 2 feet. Height from the ground to the intersection of the first branch, 8 feet. Tolerably common and used for firewood. The leaves are eaten as a sort of vegetable.

99 Ghoralaujea or Tentara ? Extreme height 30 feet. Circumference 3 feet. Height from the ground to the intersection of the first branch, 10 feet. Used for spinning wheels, sugar presses and ploughshares, and burnt for firewood, being tolerably common.

100 Kodumbo Nauclea oriental ? Nauclea cadamba ? Extreme height 80 feet. Circumference 6 feet. Height from the ground to the intersection of the first branch, 32 feet. This is sometimes made into boats in the manner previously described. The flower is offered at the shrines of the Hindoo gods.

101 Rooradea. Extreme height 12 feet. Circumference 1 foot. Height from the ground to the intersection of the first branch, 3 feet. The fruit is eaten ; but no use is made of the tree

102 Hadakonkalee. Extreme height 12 feet. Circumference 2 feet. Height from the ground to the intersection of the first branch, 4 feet. Useless.

103 Goonaicho Nerium odoratum ? Extreme height 25 feet. Circumference 2 feet. Height from the ground to the intersection of the first branch, 6 feet. This is the oleander tree and is tolerably common.

104 Gooroobolee. Extreme height 18 feet. Circumference 2 feet. Height from the ground to the intersection of the first branch, 4 feet. Wood useless. The fruit is employed medicinally.

105 Kodoro. Extreme height 30 feet. Circumference 2½ feet. Height from the ground to the intersection of the first branch, 12 feet. Only used for firewood.

106 Gondopolaso. Extreme height 45 feet. Circumference 2½ feet. Height from the ground to the intersection of the first branch, 8 feet. Bandy wheels and ploughshares are occasionally made of this wood, but it is chiefly burnt for firewood, being tolerably common.

107 Sohojo Maree. Extreme height 25 feet. Circumference 1½ feet. Height from the ground to the intersection of the first branch, 8 feet. Tolerably common in Bodogoda, where it is burnt for firewood but not in Goomsur. The bark is used medicinally.

108 Mohonea Vangueria spinosa ? Extreme height 25 feet. Circumference 1½ feet. Height from the ground to the intersection of the first branch, 8 feet. Used for firewood. The bark is employed medicinally in fever. Tolerably common.

109 Kolee Kouradea. Extreme height 25 feet Circumference 1½ feet. Height from the ground to the intersection of the first branch, 8 feet. Tolerably common and burnt for firewood, the leaves are applied to wounds. The fruit is eaten.

110 Dalosingha or Taloosinghee. Extreme height 25 feet. Circumference 1½ feet. Height from the ground to the intersection of the first branch, 6 feet. Abounds, and is burnt for firewood and charcoal. Ploughshares are sometimes made of the wood.

111 Meresingha. Extreme height 30 feet. Circumference 2½ feet. Height from the ground to the intersection of the first branch, 8 feet. Tolerably common, and burnt for firewood. The leaves are used in curry stuff.

112 Konchona, Michelia champaca ? Extreme height 30 feet. Circumference 2½ feet. Height from the ground to the intersection of the first branch, 8 feet. Tolerably common. Ploughshares are occasionally made of the wood. The flowers are offered at the shrines of the Hindoo divinities. There are two varieties of the tree called respectively the " Dhobo" and Rongo.

113 Boroana Capparis trifoliata ? cratæva tapia ? Dyosperos cordifolia ? Extreme height 40 feet. Circumference 5 feet. Height from the ground to the intersection of the first branch, 9 feet. Tolerably common and burnt for firewood. The bark is used medicinally for wounds.

114 Neraso. Extreme height 25 feet. Circumference 2½ feet. Height from the ground to the intersection of the first branch, 8 feet. Tolerably common and burnt for firewood. Ploughshares are sometimes made of the wood. The bark is used medicinally for wounds.

115 Nagishvoro Mesua ferrea ? Extreme height 30 feet. Circumference 3½ feet. Height from the ground to the intersection of the first branch, 9 feet. A medicine used for diarrhœa, rheumatism &c. is extracted from the flower. The flowers are worn by the Oriyas and the Ra-

ıhs stuff their pillows with them. The tree is olerably common, but no use seems to be made f the wood.

116 Rahana. Extreme height 30 feet. Circum-erence $1\frac{1}{2}$ feet. Height from the ground to the ntersection of the first branch, 11 feet. Tolerably ommon and burn for firewood; wooden pestles nd ploughshares are sometimes made of this rood.

117 Pochoboro. Extreme height 30 feet. Cir-umference $2\frac{1}{2}$ feet. Height from the ground to he intersection of the first branch, 6 feet. Toler-bly common, only used for firewood and char-oal.

118 Ponposo Komaree. Extreme height 30 eet. Circumference 2 feet. Height from the round to the intersection of the first branch, 8 eet.

119 Kola sahajo. Extreme height 50 feet. Circumference 4 feet. Height from the ground o the intersection of the first branch, 18 feet. bounds and is burnt for firewood and potash. The bark is used in tanning.

120 Pitolo. Extreme height 30 feet. Circum-erence 2 feet. Height from the ground to the ntersection of the first branch, 6 feet. Abounds out is only burnt for firewood.

121 Choureeona. Extreme height 30 feet. Circumference 3 feet. Height from the ground to he intersection of the first branch, 8 feet. Tolera-ly common and burnt for firewood. The bark is sed medicinally for rheumatism. The flowers re worn.

122 Chalodhona Erythrina indica? Extreme eight 30 feet. Circumference 2 feet. Height rom the ground to the intersection of the first ranch, 6 feet. Only used for firewood. Abounds.

123 Paneeollo. Extreme height 40 feet. Cir-umference 2 feet. Height from the ground to the ntersection of the first branch, 8 feet. Tolerably ommon and burnt for firewood. The bark is sed medicinally.

124 Dharonjo. Extreme height 60 feet. Cir-cumference 4 feet. Height from the ground to the intersection of the first branch, 8 feet. Tolerably common. No use seems to be made of the wood. The bark is used medicinally by women after child-birth; the juice of the leaves is supposed to cure itch.

125 Beejee Kooroowan. Extreme height 25 feet. Circumference 2 feet. Height from the ground to the intersection of the first branch, 8 feet. Tolerably common, and burnt for firewood. The milk is used for wounds.

126 Oshoko Jonesia asoca? Extreme height 50 feet. Circumference 3 feet. Height from the ground to the intersection of the first branch, 8 feet. Scarce in Goomsur, but abounds in Bodogoda, where it is burnt for firewood. The flowers are offered at the shrines of the Hindoo divinities. The bark is used medicinally for diarrhœa.

127 Korra Strychnos nux vomica? Extreme height 50 feet. Circumference 5 feet. Height from the ground to the intersection of the first branch, 20 feet. Bandy wheels and ploughshares are made of this wood. The seeds are poisonous but are used medicinally. Iron tools are sharpened on blocks of this wood. The leaves are eaten by Vishnovos. The tree is tolerably common

128 Baygoona. Extreme height 21 feet. Circumference 1 foot. Height from the ground to the intersection of the first branch, 5 feet. The wood is useless except for firewood. The leaves are used medicinally for fever. The tree is tolerably common.

129 Solopo. Extreme height 40 feet. Circumference 3 feet. Height from the ground to the intersection of the first branch, 28 feet. This is a palm held in great estimation by the Khonds on account of the intoxicating liquor which they draw from it, the inside of the tree when pounded forms a sort of flour, which is eaten by the Khonds and also by Hindoos in times of scarcity. The tree is not very common. With regard to trees of this class, it seems sufficient to state that there are two kinds of date trees termed respectively the "Bodo and Sano khojeree:" the latter is very common, the former scarce.

130 Shyalee. Circumference $1\frac{1}{2}$ feet. This is a large creeper which abounds in the jungles, and yields a fibre which is most extensively used. The leaves are used for eating from and for making "tullaries" small umbrellas worn on the head. The Seeds are used medicinally.

131 Polaso, Butea frondosa? Circumference $1\frac{1}{2}$ feet. A common creeper remarkable chiefly on account of the lac which it yields. The leaves are used for eating from, the flower yields a red dye which is used for the sectarian mark of the worshippers of Vishnoo, and is mixed with the Bokmo, to produce the red powder used at the Holee festival.

132 Contayeeoollee. Circumference $1\frac{1}{2}$ feet. This is also a large common creeper. The charcoal used in making country gun powder, is made by burning this tree. The chatty used in pacottahs is placed in a frame work made of this wood.

133 Pichoolee. Circumference $1\frac{1}{4}$ feet. This is a large creeper which is very common. The bark is used medicinally for wounds and contusions.

134 Shalimbobanso. Extreme height 40 feet. Circumference $2\frac{1}{3}$ feet. Two species of bamboo which abound.

135 Conta banso Bambusa spina. Extreme height 80 feet. Circumference $1\frac{1}{2}$ feet. Two species of bamboo which abound.

136 Bolungee banso. Extreme height 25 feet. Circumference $\frac{1}{6}$ foot. Two species of bamboo which are not common.

137 Soondorogoyan banso. Extreme height

30 feet. Circumference 3¼ feet. Two species of bamboo which are not common.

138 Bono Koniaree. Extreme height 50 feet. Circumference 3 feet. Height from ground to the intersection of the first branch, 10 feet. Used for planks, boxes and walking sticks. It is scarce.

139 Baee Dhimeree. Extreme height 30 feet. Circumference 2½ feet. Height from ground to the intersection of the first branch, 8 feet. Burnt for fire wood being tolerably common. The leaves are used for eating from; the fruit is eaten. Not very common.

140 Moddoro goodee. Extreme height 40 feet. Circumference 2½ feet. Height from the ground to the intersection of the first branch, 8 feet. Used for ploughshares and rafters and burnt for fire-wood, not very common.

141 Babolo. Extreme height 25 feet. Circumference 2 feet. Height from the ground to the intersection of the first branch, 8 feet. Used for ploughshares, sugar crushers, and for fire-wood, not very common.

142 Jundamaree. Extreme height 30 feet. Circumference 2½ feet. Height from the ground to the intersection of the first branch, 6 feet. Used for ploughshares, and burnt for fire-wood, being very common.

143 Woon. Extreme height 60 feet. Circumference 5 feet. Height from the ground to the intersection of the first branch, 5 feet. No use is made of the wood, the tree is prized on account of its fruit which is pickled, and eaten in other forms, the leaves are used for eating from; the flowers are eaten. The tree is scarce.

144 Koromonga, Avcorhoa Carambola? Extreme height 36 feet. Circumference 3½ feet. Height from the ground to the intersection of the first branch, 9 feet. No use is made of the wood, the tree is prized on account of the fruit which is pickled. The flowers are given medicinally to children. The tree is scarce.

145 Dhosora Khendhoo. Extreme height 60 feet. Circumference 5 feet. Height from the ground to the intersection of the first branch, 18 feet. Used for ploughshares and bandies. The fruit is eaten. The wood is tolerably common and is burnt for fire-wood.

146 Ambelee toba, Citrus medica? Extreme height 30 feet. Circumference 1 foot. Height from the ground to the intersection of the first branch, 6 feet. Wood useless except for fire-wood. The bark is used medicinally for colic and diseases of the stomach. The fruit is pickled. The tree is not common.

147 Modoroo toba. Extreme height 30 feet, Circumference 1 foot. Height from the ground to the intersection of the first branch, 9 feet. Wood useless except for fire-wood. The tree is common. The fruit is eaten.

148 Kheerokolee, Mimusops Kauki? Extreme height 30 feet. Circumference 3 feet. Height from the ground to the intersection of the first branch, 6 feet. A hard wood, used fo ploughs and mallets. It is not common.

149 Naringhee. Extreme height 30 feet Circumference 3 feet. Height from the groun to the intersection of the first branch, 7 feet. Use for ploughshares and bandies. It is tolerably common and burnt for firewood.

150 Kossaye. Extreme height 22 feet. Circumference 1 foot. Height from the ground to the intersection of the first branch, 7 feet. Useless except for firewood.

R. M. MACDONALD,
Assistant Agent.

RUSSELLCONDAH, Assistant Agent's Office, 4t *December* 1854.

(8203) *Hindustan Timber Trees: Dr. Roxburgh's Woods of Hindustan.*

The specific gravities have been calculated from comparatively imperfect data, and therefore can only be regarded as rough approximations

		Weight per cubic foot lbs.	oz
1	Acacia odoratissima	45	6
2	Artocarpus chaplasha	34	12
3	Averrhoa carrambola... ...	39	11
4	Castanea indica	33	0
5	Cedrela Toona	39	9
6	Cynometra polyandra	52	10
7	Diospyros racemosa	34	11
8	Dombeya melanoxylon	71	9
9	Engelhardtia pterocarpa ...	39	14
10	Gmelina arborea	32	3
11	Guacua.	41	14
12	Gundruey	34	15
13	Jeah	36	11
14	Lagerstrœmia Reginæ	46	8
15	Loquat..	46	11
16	Melia Azadirachta...	46	1
17	Nerium tinctorium...	39	4
18	Odina Wodier.	41	0
19	Osyris peltata...	30	8
20	Palm.....	57	9
21	Quercus fenestrata...	47	0
22	,, lanccofolia	41	10
23	,, lappacca....	51	4
24	Red sanders...	46	14
25	Santalum album	47	13
26	Sassafras	32	12
27	Scytalia	44	8
28	,, trijuga	60	0
29	Sophora robusta	42	4
30	Swietenia febrifuga	54	14
31	Terminalia Chebula...	42	10
32	,, citrina.....	60	2
33	Tetranthera nitida.....	34	4
34	Vateria lancifolia...	53	15

Specimens of the wood of the Indian cedar Cedrus Deodara, and of the cypress, " cupressus rulosa," from the Himalayas, were shown by r Royle at the Exhibition of 1851 : the for- er has been introduced into England as a autiful ornamental tree and appears to promise ell as a useful timber tree, as the wood works ell and freely.

(8204) *Labuan Timber and Fancy-woods.*

		Height.	*Diameter.*
1	Dadarru,	30 feet	2 feet.
2	Gabar Buto, about	60 do	3 do.
3	Jatiehina,	60 do	1½ do.
4	Kalim pupa tandok,	12 to 15 do	1½ do.
5	Kayu Aru, about	60 do	3 do.
6	do Arang, grows to a large size in Borneo.		
7	do Arru,	30	2 do
8	do Benatore bukit	70	3 do.
9	do Bencoola, about	60	3 do.
10	do Badak utan. A fruit tree.		
1	do Bidarru, ascented tree.	30	2 do
2	do Impas	40	2½ do.
13	do Gading,	25 to 30	1 do.
4	do Jamber,	30	2 do,
15	do Kandis Daham, 30 feet high 2 feet in diameter. A fruit tree.		
6	do Kalam Pappa,	30	2 do.
17	do Karye,	20	1½ do.
8	do Kapur Rangin	90 to 100 do	4 to 5 do.
9	do Kuing,	70	3 do.
20	do Kapur,	90 to 120	5 do.
21	do Koning utan,	40	2½ do.
22	do Kamuning,		0½ do.
23	do Limau,		0½ do.
24	do Laoh. Small tree.		
25	do Leda Karbau, about	60	3 do.
26	do Malam		3 do.
27	do Nasi nasi.	40	2 do.
28	do Oobah, bark used to dye red.	40	1½ do.
29	do Plye, (root),		
30	do Palah Palawan	30	1½ do.
31	do Petong,	30	1½ do.
32	do Rask,	40	2½ do.
33	do Rangas, 30 feet high 1½ feet in diameter. Used for common furniture.		
34	do Sampilou,	60	1½ do.
35	do Senangannum bukit, 90 feet high 4 feet in diameter. The fruit yields an oil.		
36	do Samuek, 30 feet high 2 feet in diameter. Used for dyeing.		
37	do. Senang Awan,	90 to 120	5 to 6 ft.
38	do. Sarogan	25	1 do.
39	do. Tampui pyah. A fruit tree.		
40	do. Foro	30 to 35	3 do.
41	do. Tobah tobahutan	30	3 do.
42	do. Taratang	20 to 30	2 do.
43	do. Urat Mata	90 to 100	3 to 4 do.
44	do. Madang sisik	50	2½ do.
45	do. Madang lada	30	2 do.
46	Kayu Nilong binar	90 ft.	A species of Palm
47	do. Sabadia	90	do. feet.
48	do. Samala	50	2½ do.
49	do. Saryiah	50	5 do.

(8205) *Madras Timber Trees, Timber and Fancy Woods,* being a classified list of woods, native, or grown in the Madras Presidency, from the Juries' Reports, Madras Exhibition: 1855 ; Dr. Hugh Cleghorn, Reporter.

1. Acacia arabica, Babool, *Eng.* Baboola. *Hind.* Curvala, *Tam.* Nulla toomma curra, *Tel.* This very hard tough wood is extensively used, but cannot be obtained of large size, and is generally very crooked. It is used for plough shares, naves of wheels, &c., and generally for all purposes, for which a bent hard wood is required. It makes excellent tent pegs.

The tree is found in every district, and is worthy of cultivation on account of its gum, timber, and its seeds, a favorite food of sheep, &c. It is of rapid growth, and requires no water, flourishing in dry arid plains, and especially in black cotton soil, where other trees or rarely met with. The bark is extensively used for tanning, and gives a reddish tinge to the leather.

2. Acacia catechu, Kheir, *Hind.* Wodahalay, *Tam.* The wood of this tree is less hard and durable than that of the other *Acacias.* The tree is small, and occurs more frequently in the Deccan than in the Carnatic. The watery extract (kut) is largely manufactured.

3. Acacia leucophlœa, Velvaila, *Tam.* Tella toomma, *Tel.* Kikar, *Hind.* A good dark coloured wood, but generally small. The specific name is given from the whitish colour of the bark, which is used in distilling arrack. This Acacia is easily distinguished by its panicled globular infloresecnce and stipulary thorns.

4. Acacia odoratissima, Caroovangay, *Tam.* A strong and heavy wood of rapid growth, attaining considerable size, and well suited for naves and felloes of wheels. The tree is abundant, and grows in almost any soil. The grain is ornamental but rather open.

5. Acacia speciosa, Dirisana, *Tel.* Velvangay, *Tam.* A very serviceable timber, easily procured at Madras, this is the *A. serissa,* which is extensively planted along the Ganges Canal. The tree is of large size and rapid growth, the wood of light colour, durable and very hard.

6. Acacia sundra, Currangally, *Tam.* A very hard, heavy and durable wood, used for posts and rice pestles. The tree is rather large and abundant, but the wood is not generally to be obtained in the market in planks of any size. At Guntoor, Mr. Rohde states that posts 5 feet long, are procurable, at 12 Rs. per 100, these are well suited for fencing, though the non-elastic nature of the wood is unfavourable to the holding

of nails driven into it. The natives regard it as the most durable wood for posts in house building.

8. Adenanthera pavonina. Wood hard, durable, red, yielding a dye, not procurable generally in any quantity. The tree is of handsome appearance.

10. Ailanthus excelsa, Peddu man, *Tel.* Peru marum, *Tam.* A large tree, resembling the ash in general appearance, wood light and white, used for making sword handles, &c.

11. Alangium decapetalum, Alinjee marum, *Tam* Anisarooly Mara, *Can.* Akola, *Hind.* The wood is said by Roxburgh to be " beautiful" and Wight found it to sustain a weight of 310 lbs. but he had never seen a ten *inch* plank. The jury had no means of verifying these statements, only one specimen having been forwarded to them.

15. Aquilaria Agallocha—Eagle wood or Aloes wood. Aglay marum, *Tam.* Agar, *Hind.* Contains a fragrant resinous substance. The specimen from Shemogah is green and old, (the two others are yellow, and appear to have been obtained from a different tree.) It remains to identify the tree yielding this odoriferous wood, which is sold by weight, and is reported to have been brought from the Malayan Peninsula.

16. Areca catechu—Betel nut palm, Sooparee, *Hind.* Camoogoo, *Tam.* A palm of remarkably perpendicular growth, attaining a height of 30 or 40 feet with a tuft of feathery leaves at the extreme top, the trunk is only a few inches in diameter, the structure of the wood is like that of palms in general, and might be used in turnery for small objects. The nut is used by the natives with the betel leaf. It is hard and peculiarly streaked, and is used in turnery for small ornamental work. Used in Travancore for spear handles and bows, for which it is well suited, being very elastic.

17. Artocarpus hirsuta. Anglie marum, *Tam.* A large tree used in Travancore for making canoes, &c., the trunk being hollowed out Rheede figures the tree and praises the timber. It is (the jury understand) confined to the Western Coast.

18. Artocarpus incisa—Bread fruit tree. A tree of slow growth, not uncommon in Gardens about Madras.

19. Artocarpus integrifolia—Jack tree, Pillah *Tam.* Panasa, *Tel.* Alasegana mara, *Can.* Excellent timber, at first yellow, changing to brown, much used for furniture in Ceylon, somewhat resembling Mahogany in colour and appearance, but does not bear great alternations of dryness and moisture, suitable for house carpentry in general. The tree grows rapidly, and the fruit is prized. A very brittle wood when dry.

20. Atalantia monophylla, Caatyaloo micha marum, *Tam.* A small tree, wood close grained, hard and heavy. It is pale yellow, and if procurable of sufficient size, would be very valuable for cabinet purposes.

23. Azadirachta Indica, Neem tree, Vaypum marum, *Tam.* Vepa Mannoo, *Tel.* Hard heavy wood, when old, difficult to work, but *beautifully* mottled, as in Mr. Rohde's specimen. The seed affords a valuable bitter oil. The tree is found every where, attaining a large size in some localities, deserving of attention for ornamental work.

24. Bassia longifolia—Mohwa, *Hind.* Elooppa marum, *Tam.* Hippa Mannoo, *Tel.* Good wood for trenails, it is comparatively free from the attacks of the *Teredo navalis*—it is procurable among the logs brought down the Godavery. It is valued for all purposes, in situations where it is not exposed to air, as planking of ships below the water line, frames on which well walls are built &c., (J. R.) Nearly equal to teak but smaller. Much used for construction of carts at Coimbatore, and in Malabar, where it attains a large size, it is used for spars. (R. W.) A valuable fatty oil is obtained from the seed.

25. Bauhinia Richardiana—Introduced from Madagascar, of this wood we have no knowledge. The trees in the country being still young.

26. Bauhinia tomentosa—Caat Attie, *Tam.* A tree of small size, the wood dark brown and hard—not much in use. Bark used as cordage. Several of the Bauhinias yield dark coloured heavy and durable timber. Diphylla is the *Yepi* of Nellore, Guntoor and Masulipatam.

27. Bauhinia variegata—Irkumbalitha mara, *Can.* A beautiful tree with variegated flowers, wood of little use.

28. Berrya ammonilla—Trincomallee wood, *Eng.* Tircanamalay marum, *Tam.* Introduced from Ceylon, the wood is annually imported from Trincomallee, by which appellation it is known in the market. It is highly esteemed for its lightness and strength, is straight-grained—slightly pliant, tough and little affected by the atmosphere, employed in the construction of the Massoola boats of Madras (Wight). Used for spokes of wheels, helves, handles, a pulse, frames, poles and shafts of carriages, it is inferior to *Saul* for spokes, and to the Babool for some other purposes, but it is comparatively light and easily worked (Rohde). The market is still dependent on importation from Ceylon.

29. Bignonia suberosa—A very handsome tree with fragrant flowers and spongy bark, which is a very inferior kind of cork.

31. Borassus flabelliformis—Palmyrah : Panna marum, *Tam.* Tatti chettoo, *Tel.* This tree is very abundant, especially in sandy tracts near the sea. It is used chiefly for rafters, joists and reapers, when of good age, the timber is very valuable for this purpose, the trunk is split into 4 for rafters, into 8 for reapers, these are dressed with an adze. Jaffna Palmyrahs are famous,

nd were largely imported in former times. rom the structure of the fibres, it splits easily n the direction of its length, but supports a reater cross strain than any other wood: iron ails, however, rust rapidly in it. The fruit and he fusiform roots of the young trees (in the orthern Cirears) are used as an article of food y the poorer classes. The leaves are used for hatching and coarse fibre. Jaggery and Toddy re extracted from the tree, the former is extenively used in the manufacture of sugar in Viziaagrum and Rajahmundry. Very neat baskets f Palmyrah leaf are made at Tinnevelly.

32. Briedelia spinosa ? Moolloo vangay, am. Wood not known in Madras, the tree is ot uncommon, and attains a considerable size the alpine jungles.

33. Butea frondosa, Palas, *Sans.* Dhak, *ind.* Porasum, *Tam.* Thorus mara, *Can.* loduga ehettoo, *Tel.* A common tree thriving ell in many parts of the country; flower deep d, used as a dye. Many esteem the wood for unpowder charcoal. The fields of Plassey ok its name from this tree.

34. Cæsalpinia coriaria, the Dibi dibi. The ee was introduced from seed supplied by Dr. allich, about 20 years ago, the pods are colcted with care, being valuable for tanning purses.

35. Cœslpinia sappan. The Sappan tree, uttungay. *Hind.* Isiapanguin, Vuttunghy, *am.* Used for dyeing; cultivated in Paulghaut r the purpose of dyeing; the straw used in at making (Wight), from its high price for this rpose, not used for carpentry.

36. Calophyllum Inophyllum. Alexandrian urel, *Eng.* Pinnay marum, *Tam.* Wooma mara, *n.* Ponna ehettoo, *Tel.* A beautiful tree with appropriate name, very common; a good mp oil obtained from the seeds, wood coarse ained, strong, durable and ornamental. The e is worthy of attention, as it grows well in ndy tracts close to the sea, where few others rive.

37. Careya arborea. Pailæ marum, *Tam.* uddadanedi, *Tel.* Cumbia, *Can.* Wood useless, e bark serves as cordage, and is used as slow atch for matchlocks in N. Cirears.

38. Careya sphœrica. Wood useless, the bark rves as cordage, and is used as slow match for atchlocks in N. Circars.

39. Caryota urens. Bastard Sago Palm. otaly pana, *Tam.* Bhynee, *Can.* A very ornaental palm, furnishes an inferior kind of sago d also toddy. Is extensively used under the me of Napiera in Ceylon for rafters, which are ceedingly hard and durable.

40. Casuarina equisitifolia. This tree was troduced about 50 years ago, and is now well tablished, growing freely and ripening seed in eat abundance. In general appearance, it uch resembles the Larch Fir,—it grows in 10 years to the height of about 30 feet. It generally grows very straight, and where the main shoot is broken or lopped off, throws out secondary shoots readily which are usually straight and erect. It thrives best in sandy tracts along the sea shore, and it would be desirable to plant it largely on the sand Hills, North and South of Madras where some numbers have already been grown. The wood is reddish in colour, in density and appearance it somewhat resembles Trincomallee. It bears a great strain, is well adapted for posts, and is said to bear submersion in water very well. The bark contains tannin, and a brown dye has lately been extracted from it by M. Jules L'Epine of Poudieherry. On the whole, this tree well deserves extensive cultivation on the sandy tracts, where it grows so readily.

41. Cathartocarpus fistula, Koannay marum, *Tam.* Rellie, *Tel.* A tree of great beauty, when in flower, but generally too small and crooked to yield valuable timber, wood close grained and used for tomtoms, &c. In the Malabar forests, it attains sufficient size for spars of native vessels. (Wight.) The Bark is one of the best for tanning.

42. Cathartoearpus Roxbürghii. A highly ornamental tree, in form much resembling the weeping ash. It is at present only to be found in gardens, but the wood is hard and handsomely marked, and may hereafter prove a valuable addition to the timbers of India.

43. Cedrela Toona, the Toon tree, Toon marum, *Tam.* Toona, *Hind.* Tundu, *Can.* A valuable tree of large size, wood reddish coloured, used all over India in cabinet making, scarcely inferior to mahogany, but lighter and not so close in the grain, often sold here under the general name of "Chittagong wood." It is the most valuable of the woods known by that commercial name. It is said to be abundant in Travancore. It is very deserving of careful enquiry, as to locality, supply &c. with a view to being brought into more extensive use in this Presidency. The specimen sent by general Cullen shows the grain and polish remarkably well: It is however of a brighter colour, and apparently a denser quality than any met with in the market, inducing a doubt as to its being of the same species. Found in the Mysore and Salem jungles in large quantities, also along the crest of the ghauts from Travancore to Goa.

44. Chickrassa tabularis, Aglay marum. Wood extensively used in cabinet making, also coming under the denomination of "Chittagong wood," being imported from that province, though it is abundant in the mountainous parts of the Peninsula. It makes beautiful and light furniture, but is apt to warp during the season of hot land winds. The wood is well known and easily procured.

45. Chloroxylon swictenia, Satin wood tree, Kodawah porsh, *Tam.* Billu kurra, *Tel.* This tree grows abundantly in the mountainous dis-

tricts of the Presidency, but seldom attains a large size, occasionally planks of 10 to 15 inches in breadth may be procured. The wood is very close grained, hard and durable, of a light orange colour. takes a fine polish, and is suited for all kinds of ornamental purposes, but is somewhat apt to split. For picture frames, it is nearly equal to American maple. The timber bears submersion well, in some instances it is beautifully feathered. There is this peculiarity, satin wood loses its beauty by age, unless protected by a coat of fine varnish.

46. Cicca disticha, Aranelly, Harfaroovri, *Hind*. A small tree bearing a round acid fruit, the country gooseberry, wood inferior.

47. Citrus aurantium, Orange tree, Kolinjee marum, *Tam.* The well known orange tree, wood hard, but not available of any size, or in any quantity.

48. Cluytia collina, Woadoogoo marum. *Tam.* Wodesha, *Tel.* A small tree, wood red colored, exceedingly hard and durable, but little is known of it.

49. Cocos nucifera, Cocoanut tree ; Tennam marum, *Tam.* Narrel, *Hind.* Tenkoi chettoo, *Tel.* Kinghena, *Canarese.* This tree thrives well on the sea coast, its uses and produce are well known, the wood is occasionally used for reapers &c.; for which purposes it is inferior to the palmyrah. In Ceylon, however, and on the Western Coast, hard and durable rafters are procurable The Cochin fibres were sent in a large box of this wood, the planks of which are prettily striped and of remarkable size.

50. Cordia latifolia. Wood very inferior, and of small size.

51 Cyathea arborea, Tree fern. The section of this tree fern displays well the structure of an Acrogenous stem, hollow in the centre, marked on the outside by the scars of the fallen leaves, and showing the elongation of the axis by junction of the petioles. Wood quite worthless as timber.

52 Dalbergia latifolia, Blackwood, Eroopoottoo, *Tam.* Bitti, *Can.* A magnificent tree, from which the well known Malabar black wood is obtained. Planks 4 feet broad are often procurable, after all the external white wood has been removed: it is heavy and close grained, admitting of fine polish, very much used for furniture. One of the most valuable woods of this presidency.

53 Dalbergia sissoides, Bittymarum, kar Itty or Blackwood. This is a smaller tree than D. latifolia, but more common in the forests, both yield a blakwood, and in Madras are indiscriminately called " Rose wood." The wood contains much oil which unfits it for receiving paint.

54. Dalbergia sissoo, Sissu, *Tel.* Introduced from Bengal at the recommendation of Dr. Wallich, grows to a large size, has been planted on the banks of the Toomboodra, and is thriving wonderfully ; it is growing extensively in the cantonment of Masulipatam, as an avenue tree, and has been planted in some places on the banks of the Kistnah Annicut. There are few trees which so much deserve attention, considering its rapid growth, its beauty and its usefulness. Wood hard, strong, tenacious, and compact, whilst its great durability combines to render it one of the most valuable Timbers known. The tree grows rapidly, is propagated and reared with facility and it early attains a good working condition of timber. It is used in Bengal for gun carriages.

55. Dillenia pentagyna. Pinnay marum, *Tam.* A stately forest tree, common on the face of the W. Ghauts. The wood is said to be exceedingly strong and durable, even when buried under ground ; this is believed to be the tree, which furnishes the *poon* spar, so valuable for shipping, though *Calophyllum Inophyllum* has hitherto been so considered.

56. Diospyros cordifolia. Vuekana marum, *Tam.* A hard heavy wood, colour dark brown ; it is difficult to work.

57 Diospyros ebenaster. Acha marum, *Tam.* Ebony of very superior quality is procurable in these districts as well as the Northern circars. Mr. Rohde has received 16 inch planks of a fine uniform black. Ebony is much affected by the weather, on which account European cabinet makers seldom use it except in veneer. The tree bearing the name " Achay" at Madras is Bauhinia tomentosa.

58 Diospyros mabola, (often called " mangosteen") under which name it is cultivated extensively in gardens at Vizagapatam.

59. Diospyros melanoxylon. Ebony, Toombic marum, *Tam.* The species of Diospyros have this peculiarity that the black heart wood is surrounded by white sapwood. There are several fine specimens of the genus, but the jury are unable to determine the species or verify the names. The subject is important and merits careful elucidation.

60 Ehretia lævis. Wood of very small size, the wood seems a good one.

61 Elate sylvestis, wild Date, Eajata, *Can.* Has the general characteristics of the family, but is inferior to the Palmyrah, Cocoanut, &c.

62. Emblica officinalis, Emblic Myrabolan, Aonla, *Hind.* Nelly marum, *Tam.* Nelly mara, *Can.* Usirika, *Tel.* A fruit tree, the wood of which would appear to be of service, for making boxes, &c.

63. Embryopteris glutinifera, Cooshartha mara, *Can.* Toomei, *Tel.* A middling sized tree, the wood is of indifferent quality. The viscid juice of the fruit is used for paying boats, and strengthening fishing nets and lines.

64. Eriodendron anfractuosum, White cotton tree, Elava marum. A soft almost worthless wood used for toys, floats &c. and such purposes.

65. Erythrina indica, Indian Coral tree, Moorkoo marum, *Tan.* Badida chettoo, *Tel.* This is the "Moochee" wood of Madras, soft and only used for toys, light boxes, trays, &c. The varnished toys from the Northern Circars are made of this wood.

66. Euphorbia tirucalli, Milk Hedge, Kulli, *Tam.* Wood light colored, the root of old shrubs s understood to be well adapted for gun stocks, but plants of sufficient age are seldom met with

67. Euphorbia Litchi. A fruit tree, introduced from China, the Litchi attains a height of 25 o 30 feet but does not ripen its fruit at Madras.

68 Eurya longifolia.

69. Feronia elephantum. Wood apple, Koit, *Hind.* Veela marum, *Tam.* Bilvurthitha mara, *Can.* Vellnga Chettoo, *Tel.* A large tree, widely diffused in India, yielding a hard strong heavy wood, much used at Vizagapatam in house building. Said to be not very durable.

70. Ficus glomerata. Rulla kith mara, *Can.*

71 Ficus Indica. Banyan Tree, Ala marum, *Tam.* Ahlada mara, *Canarese.*

72. Ficus infectoria. Bassari mara.

73. Ficus nitida.

74. Ficus racemosa. Atti mara.

75. Ficus religiosa. The Pippul Tree, Arasa marum, *Tam.* Ranghy mara, *Can.* Ray aman, *Tel.* A very poor wood.

76. Ficus virens. Goovee mannoo, *Tel.* Maulapatam. These various species of Ficus are well known, and differ little from each other in heir properties, The trees are large and of apid growth, but the timber is of little value, being light, open and soft, The large drops f the Banyan after being well soaked in water o get rid of the viscid juice are used for tent poles and such purposes, bird lime is prepared from the fresh juice.

77. Gmelina aborea. Coommy marum, *Tam.* Goommedee chettoo, *Tel.* A large timber tree, rowing in mountainous districts. The wood is ght, of a pale yellow colour, easily worked, and oes not shrink or warp; used for picture frames, ecking small boats, for making venetian blinds, ounding boards, palankeen pannels, gram meaures, &c. This tree deserves notice : it is very commonly used in the Vizagapatam district, for he foundation of wells and other purposes, which equire it to be submerged in water, where it is emarkably durable.

78. Gossypium acuminatum, The Peruvian Cotton Plant, a biennial shrub, useless as timber.

79. Grewia tiliæfolia. Chadachey marum, *Tam.* A considerable tree, wood soft, not known t Madras.

80. Grewia Sp, Makes good walking sticks, The wood of Grewia salvifolia is also good for he same purposes, and the bark of many species ields good fibres.

81. Guaiacum officinale, Lignum Vitæ. This shrub has been lately introduced, and is found to thrive remarkably well, readily flowering and fruiting. Its chief value is for medicinal purposes, but the wood, about 4 inches in diameter, is very hard and close grained, suited for turning. In time, a supply may be available.

82. Guatteria longifolia. Thavatharoo, Asoka chettoo, *Tel.* A very handsome erect growing tree, but wood soft and useless.

83. Guazuma tomentosa. A tree, pretty common about Madras, evidently planted, the fruit is tubercled, about the size of a cherry, introduced by Dr. Anderson about 70 years ago.

84. Hibiscus lampas.

85. Hæmatoxylon campechianum, Logwood. This tree has been lately introduced, the largest as yet much resembles a fine hawthorn tree in habit and size. It grows readily and seeds abundantly, but it remains to be seen whether it will attain a large size in this country. It is used only as a dye, and the bark is astringent in a considerable degree. It is a promising tree and deserves attention,

86. Hura crepitans. Sand box. A middle sized tree of rapid growth, the trunk is strongly armed, the wood light and useless. The seeds are poisonous.

87. Hydnocarpus inebrians. Murravuttay, *Tam.* A large tree, little is known of the wood, the berry is used for poisoning fish.

88. Inga dulcis. Sweet Inga or Manilla Tamarind. Seema chinta, *Tel.* Coorkapooli marum, *Tam.* A most valuable hedge plant, is now used along the line of railway, the wood is hard. Isolated trees of 12 to 18 inches diameter are occasionally found, these resemble the hawthorn in general appearance. It is the *Pithecolobiu mdulce*, Benth.

The pulp of the fruit is eatable, the seed was brought from Manilla to Samulcottah, hence the name "Manilla tamarind." The Spaniards introduced the tree to the E. Indies from Mexico.

89. Inga xylocarpa, Tangedu mara. Jamboo, *Hind.* This tree grows to a large size, and is much valued for house building, on account of its strength and toughness. It is remarkable for its thick woody legume, and is the *Xylia dolurbri formis* of Benth.

90 Jatropha multifida. Coral plant. A garden shrub.

91. Jonesia asoca. A highly ornamental garden tree, timber not available.

92. Kleinhovia hospita. A garden shrub.

93. Kydia calycina. A middle sized tree, pretty common along the Western Ghauts. Hort. Gard. 69.

94. Lagerstræmia microcarpa. Benteak. Ventakoo, *Can.* Cutcha cutta marum, *Tam.* A tree of large size with a long straight stem, the timber is of ordinary character, easily worked and suited for purposes where strength and beauty are not required.

95. Lawsonia inermis. Hennah. Mendee, *Hind.* A hedge plant, resembling the English privet, the wood strong and suited for tool handles, tent pegs, &c., the leaves yield the dye used by the natives.

96. Malphigia punicifolia. Barbadoes cherry. An ornamental shrub introduced from the West Indies.

97. Mangifera indica, Mango Tree, Maah marum, *Tam.* Mamadi chettoo, *Tel.* Mavena, *Can.* A tree of large growth, and generally diffused. The mature wood is dull grey, open, yet durable, if not exposed to wet, of the effect of which it is very sensitive. It is the cheapest wood procurable here, and used for packing cases, boarding, and rough work in general, Mr. Rohde says it holds a nail faster than any other wood known to him.

98 Melia azadirach. Margosa. Malay Vaimboo, *Tam.* Taruka vepa, *Tel.* A tree of moderate size and in some localities of large size.- The mature wood is hard, durable and handsomely marked. A valuable oil is made from the seed.

99. Mimusops Elengi. Maghidam, *Tam.* Pogada mannoo, *Tel.* Moogali mara, *Can.* A tree of moderate size, cultivated for the oil obtained from its fragrant flowers. The wood is little known.

100 Mimusops hexandra. Pala marum, *Tam.*

101. Michelia Rheedii, Sampanghy marum, *Tam.* A large tree, the wood close grained and very handsomely marked in a mottled manner. It is, the Jury understand, being tried in Bombay for ship building purposes. A remarkably large specimen is exhibited by Captain Cunningham, its dimensions are 11½ feet in length, 4½ feet in breath. and 3 inches in thickness, and is apparently derived from a tree of very great age.

102. Morinda citrifolia, Noana marum, or Munja pavettay, *Tam.* Maddi chettoo, *Tel.* A small tree of common occurrence, the wood and root much used for dyeing red, this is deep yellow, easily worked and used for common purposes.

103. Nauclea cadamba, Cudum, *Hind.* Vella Cadamba, *Tam.* Rudrakshakamba, *Tel.* A noble tree, wood yellow, used for furniture.

104. Nauclea cordifolia, Munja Cadamba, *Tam.* Daduga, *Tel.* A large tree growing abundantly in the mountainous distrcts of the Peninsula —wood yellow, rather close grained. It is used for common purposes, and easily worked, but is best suited for work which is sheltered, bedsteads, &c., being much affected by alternation of dry and wet weather. N. parviflora, (necr cadamba) is also frequent in the Western Coast, and is valued for yielding flooring planks, packing boxes, &c.

105. Parkia biglobosa. A very elegant tree of arge size, introduced from Africa, the legumes are filled with a farinaceous pulp, the wood is hard and promising. Surrounded by an astringent bark. A watery extract has been prepared, the value of which for tanning purposes has yet to be tested. A supply of timber is not yet procurable.

106. Odina Wodier—Ooday marum, *Tam.* Goompina, *Tel.* A large tree, native of mountainous districts, it is grown from cuttings, and planted in avenues, but it yields no shade in the hot weather, being without leaves till June. The wood is difficult to season, but when well seasoned, the central reddish portion is useful for many purposes.

107. Œgle marmelos, Bel, *Hind.* Vilva marum, *Tam.* Maredu, *Tel.* A thorny tree with ternate leaves, the astringent pulp of the fruit is a valuable remedy in diarrhœa; the wood is hard, but from the great medicinal value of the tree, the timber is not at present available.

108. Pavetta indica —Pavetty marum, *Tam.* An ornamental shrub 4 or 5 feet high with white flowers, timber very small.

109. Pimenta vulgaris. The "Allspice" tree, introduced from the West Indies. Several large trees are at Madras, but the climate of the Carnatic does not seem to suit them.

110. Poinciana regia. A large tree with showy coloured flowers. Introduced from Madagascar, and still confined to gardens. The wood seems good.

111. Pongamia glabra—Poonga marum, *Tam.* This large tree attaining a height of 40 to 50 feet is very common in S. India, flourishing equally well in the arid plains of the Carnatic, and on the Sub alpine tracts of Mysore. Oil is made from the seeds. Roxburgh says the wood is light, white and fit for a variety of purposes, here it is used chiefly for fuel. The boughs and leaves are extensively used as manure.

112. Premna tomentosa—Koleuttay teak. *Tam.* A small tree. Wood hard and close grained of a brownish yellow colour, well fitted for ornamental purposes.

b 113 Prosopis spicigera—Parumbay, *Tam.* A thorny tree, not uncommon in the lack cotton soils, attaining a large size in Mysore. Wood strong, straight-grained, and easily worked. The foliage of the ree and the character of the wood, closely resemees that of its congener *Acacia sundra.*

114. Psidium pyriferum. Guava tree, Coaya marum, *Tam.* Sebe mara, *Can.* The common Guava, found every where in gardens, which probably found its way to India from S. America through the Portuguese. Wood small, but very hard, used by Dr. Hunter for wood engraving, and commonly for pegs, mallets, handles of tools &c.

115. Pterocarpus Indicus, *Wall.* Padouk *Burmese.* The "padouk" is a handsome tree with long waving branches and clusters of yellow flowers, which scent the air. It produces very fine timber, and may be considered one of

ur most valuable forest trees. This species also ields Gum Kino.

116. Pterocarpus marsupium. Vangay marum, *am.* Whonay, *Can.* Yeangasa, *Tel.* A large andsome tree, widely diffused, yielding one of ie most abundant and useful timber of S. India, hen wet, it gives a yellow stain. Mr. Rohde tates, that it is better suited for weather boards, xposed venetians, &c., than any other wood he as tried. It is heavier than teak, and more ifficult to work. This tree yields the gum ino of commerce which is exported from Ialabar. The timber is now being tried as leepers on the Madras Railway.

117. Pterocarpus santalinus, Red Sanders, utta Sandanum, *Hind.* Savapoo Sandanum, *am.* This tree which grows abundantly in the agarry Hills, yields the "Red Sandal wood" of ommerce. It is sold by weight as a dyewood, nd forms a regular article of export. It takes a eautiful polish, but the high price of the wood or dyeing purposes, precludes its use as a timber.

118. Pterospermum Indicum—Kyabooca. his wood is obtained from the knotty excrescenes or burrs of Pterospermum Indicum? it is awn off in slabs—2 to 4 feet long and 2 to 8 iches thick. It resembles the hue of the yew, is ery hard and full of curls—the colour being eddish brown, varying to orange. It is very ornamental, and much esteemed in China, India nd England, where it is used for making small oxes, writing desks and other fancy ornamental ork. The wood is brought to Singapore by astern traders, and is sold by weight.

119. Rottlera tinctoria—Cupela, *Hind.* Sarakasary mara, Chendurapa chettoo, *Tel.* A large ree common in the Deccan and the Northern ircars. The red mealy power which covers the apsules is used in Mysore to dye silk. Wood oft and inferior.

120. Salmalia malabarica—Red Cotton tree, oola marum, *Tam.* Moollelavoo, *Can.* Booraga, *el.* A large common tree, flowers of a beautiul red colour, thewood light, and spongy ; used y Moochees in their work, but very inferior.

121. Santalum Album—Sandal wood, Shanlanum, *Tam.* Gandaga mara, *Can.* This very aluable tree, yielding the sandal wood of commerce, is found in abundance in Coorg and Mysore, paringly in Canara. It is usually cut into billets, nd disposed of by weight. The uses are well nown. The scent is believed to be much modiied by peculiarities of soil and elevation.

122. Sapindus emarginatus—Soap-nut tree, oochee-cottay, *Tam.* A tree met with about illages all over the country. The fruit used as ndicated by the native name and sold in all azaars. Wood white, only used for fuel. In nany situations, this tree yields a more profitable eturn than any other fruit tree.

123. Schmidelia serrata. A straggling shrub, vith ternate leaves. Timber very small.

124. Semicarpus anacardium—Marking nut tree, Shayng cottay, *Tam.* Bhela, *Hind.* Jadi chettoo, *Tel.* This common tree is of no value as timber. A considerable quantity of the nuts are exported from the Deccan, and Mysore, as a mordant. The juice is so acrid, that wood cutters are unwilling to cut the tree.

125. Sethia Indica—Thavadarm, *Tam.* When fully grown, it is still a small tree, the fruit yields an oil, and the wood is esteemed as a substitute for Sandal wood.

126. Soymida febrifuga, Red wood, or Bastard Cedar, Shem Marum or Choar Kullie Marum, *Tam.* Soymeda, *Tel.* A large tree, tolerably abundant, timber most durable and strong, yet light and easily worked, deserving of attention.

127. Spathodea adenophylla. A small introduced tree.

128. Spathodea Sp.

129. Sterculia fœtida. Peenary marum, *Tam.* Gurrapa Badum Chettoo, *Tel.* A large tree, but chiefly found on the W. Coast and Mysore where it is applied to a number of useful purposes. This is one of the trees which are believed to furnish the smaller "Poon spars."

130 Sterculia guttata. A large tree.

131. Stereospermum suaveolens, Padrie marum, *Tam.* Ooloonanthree mara. *Can.* A middle sized tree with pinnate leaves, and panicled inflorescence, very fragrant wood (according to Wight,) strong and elastic, said to be suitable for making bows.

132 Strychnos nux vomica, Nux Vomica Tree, Yetti marum, *Tam.* Musidi, *Tel.* This well known tree is small, wood white and very hard, used for plough shares. The poisonous fruits are the favorite food of the Buceros Malabaricus, Hornbill.

133. Strychnos potatorum, Clearing Nut tree Taita marum, *Tam.* Judapa chettoo, *Tel.* A larger tree than the above, the fruit is well known as possessing the property of clearing water ; wood hard and serviceable, though of small size.

134. Syzygium jambolanum, Jamoon, *Hind.* Nawel marum, *Tam.* Nœrala mara, *Can.* Neradi, *Tel.* A fine large tree of common occurrence, suited for avenues ; the fruit small, and somewhat astringent, sold in the bazaars. The wood is much used for ordinary purposes, but is of little value.

135. Tamarindus indica, Tamarind-tree, Poolia marum, *Tam.* Chinta chetoo, *Tel.* Oonara mara, *Can.* A large and very handsome tree, of slow growth ; the wood hard, durable and fine veined, but apt to be faulty in the centre. The ornamental character of the wood is well shown in the handsome specimen contributed by Mr. Rohde. It is used in the manufacture of oil for its fruit and shade.

136. Tecoma stans. An ornamental garden shrub.

137. Tectona grandis, Teak, *Eng.* Teak marum, *Tam.* Tek chettoo, *Tel.* A native of the mountainous parts of Malabar, and the country bordering the Godavery, the Moulmein and Rangoon forests. This well known and far-famed tree grows straight and lofty, with cross armed panicles of showy white flowers. It seems to require 80 years to attain perfection. The wood is very hard, but easily worked; it is soon seasoned, and being oily, does not injure iron; and shrinks little. It is probably the most durable timber known, hence its value in Ship-building. The Malabar teak is considered the *best,* and is always most valued in our Government dock yards. A valuable report by Dr. Falconer on the Teak forests of the Tenasserim Coast, was published lately among the selection of Records of the Indian Government. The price of Teak wood in 1855, is 3 Rs. per cubic foot, double the ordinary rate. It is matter of regret considering the vast importance of teak timber to England, as a maritime nation, that the preservation of the teak forests was so long disregarded.

138. Terminalia alata, Marudum marum, *Tam.* Kooramarthi mara, *Can.* A very large tree, used on the Western Coast for house building and making canoes.

139. Terminalia belerica, Tanikoi or tandee marum, Cattoo eloopæ, *Tam.* Tadi chetoo, *Tel.* A very large tree with a straight trunk and spreading head; wood white and soft, but not much used. The flowers have an offensive smell. The kernel of the fruit is eaten by the natives.

140. Terminalia Berryi, Vella murda, *Tam.* This tree also attains a large size, especially at the foot of the W. Ghauts, where it is used for canoes, &c.

141. Terminalia eatappa, Natvadom eottay, *Tam.* Badum, *Tel.* A beautiful large tree, found in gardens, &c., the kernels are eaten and are palatable, the wood is also useful.

142. Terminalia Chebula, Pilla murda or Kadookoy, *Tam.* Alali mara, *Can.* Heerda, *Duk.* Karaka chettoo, *Tel.* A very large tree, fruit used by harness makers. The leaves are punctured by an insect, and hollow galls are developed, which are powerfully astringent, and answer well for making ink. They also yield chintz painters and carpet weavers, their best and most durable yellow. (Roxb.)

143. Terminalia glabra, Curry murda, *Tam.* A large tree, wood dark coloured, very hard, heavy and strong, Dr. Wight speaks highly of this wood, and states that large beams are readily procurable at Coimbatore for house building purposes. It is very hard, heavy and durable under water.

144. Thespesia populnca, Poorsungkai, *Tam.* Gungarani, *Tel.* A tree much used for avenues, of quick growth, and yielding good shade. Thi generally grows from cuttings, and althoug such timber is strong, hard and durable, but rarely to be met with good, owing to the trees rotting at the heart. It is procurable, fit for chairs &c. The tree abounds in old gardens, and abou all European Stations, thriving best near th sea.

145. Thevetia nerüfolia, A garden shrub called the "Exile." The wood is worthless.

146. Vaehellia farnesiana, Jali mara, *Can.* Ved vully, *Tam.* An armed shrub, very common i Mysore and Decean, exuding much gum like th babool, which it greatly resembles in its timber the size is very small.

147. Vatica robusta, Saul, *Hind.* Googilam *Tel.* A wood in great repute, belonging to th *Dipterocarpeæ;* it is most valuable for house an ship building, Vats for liquids, door frames, an the rails and battens of doors; it is not suite for planks, it twists, shrinks, and warps, whenever the surface is removed, even after many years' seasoning. This wood is in general use for building purposes in the Ganjam and Vizagapatam Districts. "From Colonel Baker's excellent experiments, it appears that, compared with Teak, its strength is about 1121 to 869. From Major H. Campbell's valuable experiments, unseasoned Saul broke with a weight of 1,308lbs., seasoned Saul with 1,319lbs., and teak wood with 1,091lbs. It is unquestionably the most useful known Indian timber for engineering purposes," (Jury Reports, Great Exhibition.)

148. Visenia umbellata. A considerable tree of great beauty, with rose coloured flowers and velvetty leaves; introduced from Sumatra, the seeds having been sent to the Horticultural Society's Garden, by Dr. Wallich.

149. Vitex alata. A small tree found in the Naggery Hills, leaves ternate, petioles winged.

150. Vitex altissima. A large tree of great beauty, when in flower, frequent on the slopes of the Western Ghauts, reported to be fit for cabinet purposes.

151. Wrightia antidysenterica. Veppaula, *Tam.* Pala chet oo, *Tel.* A small tree of common occurrence in Mysore and the Hilly parts; its medicinal virtues are worthy of attention, but the wood is of little value. The bark was formerly in request under the name of *Conessi* and is still esteemed a valuable drug by the natives. It appears to have lost its value in commerce, from not being distinguished from the bark of Wrightia tinctoria which grows in same places.

152. Wrightia mollissima. Introduced from the Naggery Hills; the yellow juice might be turned to account, butthe timber is of no value.

153. Wrightia tinctoria, Palay marum *Tam.* A small tree, the leaves of which yield an inferior kind of Indigo. Wood white and close grained, said to be suited for Turnery.

154. Zizyphus jujuba. Yellanday marum,

Tam. Elanjee mara, *Can.* Gooly mara, *Can.* Ber, *Hind.* Rega, *Tel.* The wild *Ber* tree, common almost every where ; wood hard and useful, but of small size. It is used for making sandals.

(8206) *Woods of Malabar Forests* (*J. E. Chapman.*)

These woods were collected, in 1846, by Dr. Gibson, Conservator of Forests in the Bombay Presidency, for Mr. Chapman, in connection with the projected " Great Indian Peninsular Railway."

1 Jamboo ; a very heavy wood.
2 Kad kud.
3 Kelaho.
4 Koompoly.
5 Kendel ; a heavy, strong, dark wood.
6 Kunganee.
7 Kursing.
8 Kumdee.
9 Marlee ; a very heavy, brown wood.
10 Ombah.
11 Pood goossa.
12 Ruccuh korurah ; a very straight-grained wood.
13 Satannah ; a light, soft, close wood.
14 Sarrah.
15 Seerass.
16 Sood beebo.
17 Sawree ; a white, soft wood, very light.
18 Teh pully.

19 " Jamboo," or Jambu, Mimosa xylocarpa. This tree grows to a large size : on account of its strength and toughness, it is much valued for house building.

20 " Mairtee," Pentaptera coriacea, a very common tree both above and below the Ghauts The wood is very durable, and is therefore used in house, ship, and boat-building.

(8207) *Martaban Timber trees, being Woods of Martaban* (*Dr. Wallich*).

1 Calophyllum. Thurappe. A large tree ; used for masts and spars.

2 Careya. Zaza. Used for posts, &c.

3 Cynometra. Maingga. A small tree.

4 Diospyros (?). Ryamucha. Used in house building

5 Elæococarpus. Very large timber : used for masts and house posts.

6 Fagraea fragrans. Annah-beng. Compact, hard, yellow, and very beautiful wood ; little used.

7 Gordonia (?) Zaza. Large common timber.

8 Hopea odorata. Tengaun. An immense tree.

9 Meenaban. A durable pliant wood.

10 Pongamia atropurpurea. Lagun. A noble tree used in boat and house building.

11 Quercus Amherstiana. Tirbbae. A large tree ; used in boat building.

12 Tectona grandis. Teak wood.

13 Terminalia bialata.

14 Xanthophyllum. Saphew. A very large tree ; used for posts and rafters.

15 *Pterospermum Indicum.* Lingoa wood, or the Amboyna wood of commerce, is from Ceram in the Moluccas. It was imported in considerable quantities into Great Britain during the period in which the Moluccas were British possessions. This wood, which is very durable and capable of a high polish, is abundant at Ceram, New Guinea, and throughout the Molucca seas. It can be obtained in any quantity, if the precaution is taken of ordering it during the previous trading season. The Kayu Buka of commerce is the gnarled excrescence of this tree.

16 Lingoa wood, from Ceram. A circular slab 6 feet 7 inches in diameter. These large circular slabs are obtained by taking advantage of the spurs which project from the base of the trunk, as the tree itself has not sufficient diameter to furnish such wide slabs. They are occasionally met with as large as 9 feet, but the usual size is from 4 to 6 feet.

17 Kayu Buka, from the Moluccas. This wood is obtained from the knotty excrescences which are found on the stems of the Lingoa tree It is brought to Singapore by the Eastern traders from Ceram, Arru and New Guinea, and is sold by weight. It is much esteemed as a fancy wood.

(8208) *Moulmein Timber and Fancy-woods.*

Of the eleven Timbers forwarded to the Exhibition of 1851, from Moulmein, by J. R. Colvin, Esquire, Commissioner of the Province in 1847, under their native names, several have been identified by Dr. Falconer during his visit to the Teak forest of the Tenasserim Provinces in 1848-49 :—

1 Lagerstrœmia macrocarpa, pyen-ma, *Burm.* commonly known under the name of jarrool.

2 Careya sphoerica, Bambooce, *Burm.*

3 Cyrtophyllum fragrans, Anan, *Burm.* One of the Nux Vomica tribe ; One of the hardest, most compact, and heaviest woods known.

4 Pyen-ma and kazaret, *Burm.* Undetermined.

5 Pterocarpus indica, Podauck, *Burm.* One of the Leguminosæ, called Rosewood. It is a very beautiful and hard compact timber, closely resembling the Andaman wood.

6 Indike, *Burm.* Ebony.

7 Anan, *Burm.* See above.

8 Hopea odorata, Thengan, *Burm.* Of the Dipterocarpeæ or saul tribe ; a very strong but coarse-grained timber.

9 Inga xylocarpa, Pyangadean, *Burm.* belonging to the Acacia tribe commonly called the

iron wood of the Arracan provinces, very hard, dense and durable.

10 Rosewood of the Tanasserim provinces, a very beautiful, hard, compact timber, resembling "Andaman wood," which is occasionally seen in the bazar of Calcutta. Mr. Mason says that the yellow wood of the jack affords beautiful timber for furniture, and in some parts of India it is highly valued. The heart of old tamarind trees furnishes a hard dark-coloured wood, resembling ebony Roxburgh says the wood is "durable and beautifully veined." *Cassia florida* has wood "not inferior to ebony." *Pongamia glabra*, and *Wrightia coccinea* have light fine wood. The Ceylonese iron wood tree, *Adenanthera pavonina*, *Vachellia Farnesiana*, *Acacia Catechu*, and the jujube tree furnish hard, tough wood. *Cassia fistula*, *Cassia nodosa*, the chestnut tree, *Sandoricum indicum*, *Nauclea Cabamba*, and one or two species of eugenia afford good timber. These are among more than a hundred trees in the Tenasserim Provinces that furnish valuable woods, of which the selection of fifty or sixty would embrace the most useful.—*Mason.*

(8209) *Woods of Paulghaut Jungle.* (*Col. Frith.*)

1 Ab Eney, brown colour. A large tree; used for furniture.

2 Bumboo, yellow colour. A large tree; used for building and for furniture.

3 Benteak, light colour, specific gravity 0.591. Inferior; used for building and common carts.

4 Cedar, reddish colour, specific gravity 0.597. A large tree, wood aromatic; used for furniture.

5 Cedar-root. Very aromatic; used for ornamental furniture.

6 Cantovanga, dark colour. Very strong: used for wheelwright's work.

7 Chadachey, light brown colour. A small tree; used for buildings and carts.

8 Eroopoottooirvolly, brown colour, specific gravity 0.861. Used for buildings and bullock-yokes.

9 Ittee veittee, black colour. A small tree; used for furniture.

10 Kullen teak, dark colour. The best teak; very strong and large.

11 Kurroovalagom, light brown, specific gravity, 0·704. A small tree; used for naves of wheels.

12 Kurroomardoo, dark colour. Strong wood; used for wheel wright's work.

13 Kuroongaulee. dark colour. A heavy and hard wood used for furniture.

14 Muroodoo, light colour. A small tree; used for buildings.

15 Nova, white colour. Used for shafts, cart-poles, &c.

16 Oome teak, dark brown colour. Third rate teak

17 Oodoogoo, red colour. A large tree used for ploughs and building.

18 Portia, brown colour. A small tree used for musket-stocks.

19 Teak, light colour, specific gravity 0 852 Second-rate teak.

20 Vangay, light brown colour, specific gravity 0·788. A small tree; used for beam. and carts

(8210) *Pegu Timber Trees, Timber and Fancy-woods.*

Of the Forests generally.

White Woods.—Eighty-five species are soft and useless, being only fit for fuel. Many of them however are valuable, either for their fruit, gums oil-seed or spices; others, for their close and compact structure, are employed in the manufacture of small ware, as a species of *Nauclea* used for making combs and two species of *Erythrina* yield the light charcoal employed in the manufacture of gunpowder.

These light woods, useless as timber, belong to the families of *Urticaceæ* (including more than twenty species of *Ficus*,) and *Sterculiaceæ*, *Laurineæ*, *Rubiaceæ*, *Myristicaceæ*, *Anonaceæ*, *Spondiaceæ* and *Bignoniaceæ*, with odd species from other families.

The remaining white woods, twenty-five in number, valuable for their strength and closeness of grain, demand a more extended notice. Seventeen of these are fit for house-building, and eight, from the hardness and fineness of their grain, render them valuable as fancy woods for cabinet making.

Red-colored Woods.—These are twenty-five in number, seven of which, from their strength and solidity, are adapted for the various purposes of house-building; seven, from the elegance of their grain and colour, are suited to the various purposes for which mahogany is used, and eleven are suited to the finer purposes of fancy cabinet work.

Yellow Woods.—These are three in number, hard and fine grained, and suited to fancy purposes.

Dark-brown Woods.—These are twelve in number and are all valuable. Eleven are adapted for house-building, and probably for ship-building, and one for special purposes requiring great strength and hardness.

Black Woods.—These consist of four different kinds, all of which are valuable for their strength and hardness.

Light-brown Woods.—There are seven varieties of this colored wood, embracing all the timber of most value in the Province, exclusive of Teak.—*McClelland.*

List of 25 White-Colored Woods.

Nos. 1 to 17 are adapted to every purpose of ouse-building.

Nos. 18 to 25 are adapted for fancy work and abinet making.

1. *Hibiscus macrophylla* is very plentiful in orests of the Pegu and Tounghoo districts. It s a tall slender timber, of three or four feet girth, nd would do for boards and house posts. Vood white colour and adapted for every purose of house-building.

2. *Kydia calycina.* Bokemaiza. *Burm.* Is plentiful throughout the Forests, more especially in he Pegu and Tounghoo districts. The small aplings are used, from their great strength and lasticity, by the natives, for making banghy ticks, but it is large enough to afford timber of hree or four feet girth. Wood white color and dapted for every purpose of house-building.

3. *Eriolæna tilifolia.* Let-pan. *Burm.* Grows lentifully throughout the Pegu and Tounghoo istricts, attaining a height of fifty feet, with a irth of seven or eight feet sometimes, but usually bout six feet. It is a strong tough timber, simiar in its properties to Kydia. Wood white coour and adapted for every purpose of houseuilding.

4. *Connarus speciosa.* Gwai-donk, *Burm.* Plentiful in all the Forests growing scattered with eak in the Tounghoo district and in the Forests f Pegu. It is a large, heavy and strong timber. Vood white colour and adapted for every purose of house-building.

5. *Grewia floribunda.* Myat-yah, *Burm.* A ery common tree from Rangoon to Tounghoo. t is a good serviceable timber for all ordinary urposes of house-building. There are three ther species of *Grewia—G. asiatica* is a large ree like *G. floribunda,* but not so plentiful. he other two kinds are small and comparatively caree. Wood white colour and adapted for every urpose of house-building.

6. *Grewia Spectabilis* and *G. Hookerii.* Phet voon, *Burm.* Both very plentiful, and of a quaity like the last mentioned. They attain a girth f about three to four feet and grow up tall and emarkably straight. They are found with Teak n the Forests of Pegu and Tounghoo. Wood vhite colour and adapted for every purpose of ouse-building.

7. *Sapindus rubiginosa.* Hseik-kyee, *Burm.* his tree is not very plentiful. It is found in he Pegu district, where it attains a girth of hree or four feet, growing tall in proportion nd straight. Wood white colour and adapted or every purpose of house building.

8 *Millingtonia Simplicifolia* is also scarce, ut found in the Forests of the Pegu Valley. ts properties as a timber are valuable from its veight and strength. Wood white colour and dapted for every purpose of house-building.

9. *Sandoricum Indicum.* Theit-to. *Burm.* This timber is large and plentiful, both in the Rangoon and Tounghoo districts. It is one of those trees which are cultivated by the Burmese for their fruit. It is found near all large villages, but it is scarce in the forests. Wood white colour and adapted for every purpose of house-building.

10. *Amoora (Aglaia) rohituca.* Chayankayoe. *Burm.* This tree is scarce, but found in the Tounghoo Forests. Wood white colour and adapted for every purpose of house-building.

11. *Juglans tricoca.* Ta-soung-let-wah, *Burm.* Scarce, but found on the banks of the streams in the Pegu district. It is a hard strong timber. Wood white colour and adapted for every purpose of house-building.

12. *Geloxium bifurium.* Hsai than bayah, *Burm.* Is found in the Rangoon district, it seldom exceeds three feet in girth, and is only fit for house posts. Wood white colour and adapted for every purpose of house-building.

13. *Excecaria agallocha.* Bone-bayaza, *Burm.* Plentiful in the Rangoon and Tounghoo districts. Wood white colour and adapted for every purpose of house-building.

14. *Walsura piscidia.* Joe-boe, *Burm.* This tree is very plentiful in the Pegu and Tounghoo Forests, as well as in the Tharawaddy Forests. The timber is large, heavy and strong. Wood white colour and adapted for every purpose of house-building.

15. *Canarium geniculatum.* This is a large and valuable timber found in the Pegu Valley but it is scarce Wood white colour and adapted for every purpose of house-building.

16. *Indigofera sp.* Doun-daloun, *Burm.* This tree is four or five feet in girth, found both in the Rangoon and Tounghoo districts though it is scarce. Wood white colour and adapted for every purpose of house-building.

17. *Terminalia belerica.* Pangah, *Burm.* and *T. violata.* Laibwai, *Burm.* The latter very plentiful throughout the Pegu, Tounghoo, and Tharawaddy Forests; the former less plentiful. Both are large timber and would answer for all purposes of house-building. Wood white colour and adapted for every purpose of house-building.

Woods from Nos. 18 *to* 25 *are adapted to fancy work and Cabinet making.*

18. *Semecarpus anacardium.* Chai-bin, *Burm.* Is a middle-sized tree, common in the Pegu and Tounghoo Forests. Adapted for fancy work and cabinet making.

19. *Sibia sp.* (*glomerata*) Thit-phyew, *Burm.* Very plentiful in Prome, Pegu and Tounghoo, as well as about Donabew; a compact and close-grained wood, seven or eight feet in girth, and is a timber that deserves to be attended to with a view of bringing it into use. Adapted for fancy work and cabinet making.

20. *Casuaria pentandra.* Thabyaiywet-kya,

Burm. Scarce, but found in the Pegu district. Timber strong and close-grained. Adapted for fancy work and cabinet making.

21. *Chaulmoogra odorata.* Taliennoe, *Burm.* There are a few trees of this about Rangoon, and it is also met with on the banks of streams in the Tounghoo Forests, but must be considered scarce. Adapted for fancy work and cabinet making.

22. *Strychnos nux vomica.* Kha-boung, *Burm.* This is a very common tree throughout the Forests. The timber is strong and close-grained, but never of very large size. Adapted for fancy work and cabinet making.

23. *Conocarpus robustus.* Baib-ya, *Burm.* Very large and strong timber, growing plentifully in the Pegu, Tounghoo and Prome Forests along with Teak. Adapted for fancy work and cabinet making.

24. *Bauhinia parviflora.* also *B. brachycarpa.* Bwai-jin. *Burm.* The former attains three or four feet in girth, the latter is of rather smaller size. The first is very plentiful throughout the Tounghoo and Prome Forests. Adapted for fancy work and cabinet making.

25. *Elæodendron integrifolia.* Jonk-bin, *Burm.* This is a very plentiful, strong, fine timber, and is found throughout the Forests of the Tounghoo and Pegu districts, as well as about Rangoon. Adapted for fancy work and cabinet making.

List of 7 Red colored Woods.

The following seven sorts, Nos. 26 to 32, are strong and adapted for house-building :—

26. *Heritiera minor* and *H. litoralis.* Kanazœ, *Burm.* These species are common in the Rangoon district, along the creeks and Sunderbunds. They are the Soondree wood so well known in Bengal for its strength and durable qualities. Wood red colour strong and adapted for house building.

27. *a. Eugenia pulchella.* Khway-tha-byai. Very plentiful in the Pegu and Tounghoo districts.

b. E. myrtifolia, Thabaijeen, *Burm.*

c. E. vulgaris. Thabyai-tha phan, *Burm.*

d. E. Ternifolia Thabyew-tha-byai, and *E. jambolana* also occur, but less plentifully than the first-mentioned species. They all afford excellent close-grained strong timber, but subject to the attack of with ants. Wood red colour strong and adapted for house-building.

28. *Sonneratia apetala.* Kambala, *Burm.* A strong hard wood of coarse grain, found throughout the Sunderbunds, under the parallel of Rangoon. It is the timber of which boxes for packing beer and wine are made in Calcutta. Wood red colour strong and adapted for house-building.

29. *Terminalia chebula.* Kayoobin, *Burm.* A large timber, plentiful throughout the Teak Forests. Wood red colour strong and adapted for house-building.

30. *Lagerstræmia Pymmah.* Pymm *Burm.* A common and valuable timber, fou generally all over the country. It ceases ho ever a little below Tounghoo and Prome, so t at those places it cannot be made available building purposes ; but at all the lower statio from Prome and Tounghoo downwards, it oug to supersede the use of Teak. Wood red colo strong and adapted for house-building.

31. *Aglaia Spectabilis.* A large tree, m with along the banks of rivers in the Pegu a Tounghoo districts. It affords a light servic able timber, somewhat stronger than the Ame ean Pine, and capable of being wrought wi little labour. Wood red colour strong and adap ed for house-building.

32. *Ulmus alternifolius* and *U. integrifoli* Thalai, *Burm.* Two of the largest trees in t province ; they are found about towns and vi lages in the Prome district, but not below th latitude. The elms to which family the trees i question belong afford valuable timber. Woo red colour strong and adapted for house buil ing.

The following seven kinds of red wood, Nos. 3 to 39, are equivalent to mahogany :—

33. *Cedrela Toona,* Thit-kodo, *Burm* Found on the banks of streams in the Toungho district, but it is scarce. Wood red ; equivalen to mahogany.

34. *Swietenia chikrassa.* Nga-bai, *Burm* Found along with Teak in the Pegu district but it is not very plentiful. Wood red ; equivalent to mahogany.

35. *Armosia dasycarpa.* Thitwajee, *Burm* This is found here and there widely scattered i the Swar and other Forests North of Tounghoo Wood red ; equivalent to mahogany.

36. *Pterocarpus dalbergioides. Padouk.* This is found chiefly as a large tree about the neighbourhood of Prome and habited places to the north of that town, but rarely in the Forests. Wood red ; equivalent to mahogany.

37. *Careya arborea.* Banbwai, *Burm.* This is one of the most numerous trees throughout the province. The timber is large, and together with the following, forms the chief material of which the carts of the country are made. Wood red ; equivalent to mahogany.

38. *Barringtonia acutangula.* Kyai-tha, *Burm.* and *B. speciosa.* Kyai-gyee, *Burm.* The former most plentiful in the Tharawaddy district and the latter in the Pegu Forests. The wood is hard and of fine grain. It is used in constructing carts. Wood red ; equivalent to mahogany.

39. *Castanea indica,* Theet-khya, *Burm.* Is a large tree, plentiful in the Rangoon, Pegu and Tounghoo districts. Wood red ; equivalent to mahogany.

The following eleven kinds of Red Wood, Nos. 40 to 50, are adapted to cabinet making :—

40. *Adenanthera pavonina.* Ywaigyee, *Burm.* ound in the Rangoon, Pegu and Tounghoo disricts, but widely dispersed and not very plentiful. Red wood and adapted to cabinet making.

41. *Catophyllum longifolium.* Thar-rabee, *Burm.* This is found near towns, together with wo other species of the same genus, which are f smaller growth. Red wood and adapted to abinet making.

42. *Dolichampia pomifera.* Doukyamah, *Burm.* This has been found on the Pymmah houng in the Pegu Valley. The trees are from hree to four feet in girth. Red wood and adapted to cabinet making.

43. *Pygium acuminata.* Scarce, but found n the banks of streams in the Tounghoo district ttaining a girth of five or six feet. Red wood nd adapted to cabinet making.

44. *Photinia serratifolia.* Doukyat, *Burm.* ound in the neighbourhood of Rangoon and long the banks of the stream in the Rangoon istrict, in the direction of the Teak Forests. ed wood and adapted to cabinet making.

45. *Acacia stipulata.* Seet, *Burm.* A large eavy timber, found throughout the Forests from angoon to Tounghoo. Red wood and adapted o cabinet making.

46. *Acacia catechu.* Shabin, *Burm.* Large nd plentiful timber, found in great quantities n Forests of the Prome and Tharawaddy disricts, as well as on the Shan side above oungIhoo district. Red wood and adapted to abinet making.

47. *Acacia serissa.* Seet, Burm. Found hroughout the province ; timber large and lentiful, particularly in the Tounghoo district. ed wood and adapted to cabinet making.

48. *Acacia elata.* Seet, *Burm.* Plentiful the Pegu, Tounghoo and Prome districts ; imber straight, lengthy and of large girth. Red ood and adapted to cabinet making.

49. '*Ricinus diococa.* Tawthedinbin, *Burm.* carce and found only on the banks of streams in he Pegu and Tounghoo districts. Very tall arge timber. Red wood and adapted to cabinet aking.

50. *Antidesma paniculata.* Byitzin, *Burm* mall crooked timber, of close grain, found in the angoon, Pegu, Tounghoo and Tharawaddy orests. Red wood and adapted to cabinet, aking.

Yellow Woods.

There are three kinds fit for fancy work, viz.

51. *Gmelina arborea.* Kyoonboe, *Burm.* lentiful in the Pegu and Tounghoo Forests. It s a large and remarkably strong tough timber. Wood yellow, fit for fancy wood.

52. *Morinda bracteata.* Yaiyoe, *Burm.* nd *M. excerta,* Mhan bin, *Burm.* Both are mall trees, only found about Phoungyee houses, in a cultivated state. Wood yellow, fit for fancy wood.

53. *Garcinia Cowa.* Toun-tha-tai, *Burm.* Scarce, but found widely dispersed in the Forests. Wood yellow, fit for fancy wood.

Dark-brown Woods.

54. *Pterospermum aceroides,* Thamajamwaizoke : also *P. subacerifolium,* and *P. acerifolium.* Najee *Burm.* Three, species of large timber, found growing along with Teak in all the Forests. The two first are plentiful but the third kind is scarce. This timber is extremely valuable and is as strong as either Teak or Oak. Its durability for purposes of ship-building has never been tested, because it has never been desicated or killed like the Teak. It attains a girth of ten or twelve feet and rises to a lofty height. Wood dark brown.

55. *Pentaptera arjuan* and *P. glabra.* Toukkyan, *Burm.* This is also a valuable timber found growing in all the Teak Forests ; it consists of two kinds, both of equal value. The timber is as strong as Teak and usually attains a girth of from seven to nine feet, with height in still more lofty proportion. This timber has never, I believe, been fairly tried for ship-building. Wood dark brown.

56. *Melanorrhœa usitata.* Theet see, *Burm,.* This is the *Theet-see* or *Lignum vitæ.* of Pegu. It is plentiful in the Tounghoo and Prome Forests, especially in the former. It is of dark red colour, of extreme closeness of grain and density of structure, with a specific gravity so great, that it serves in place of iron as anchors for native boats. Its great hardness and weight prevent its being employed in house-building. It would answer for sheaths or block-pulleys and other purposes connected with machinery, where great strength and density are required. The tree is very common above the parallel of Tounghoo and grows to a girth of six feet. Wood dark brown.

57. *Dolichampia pomifera* Doukya-mah, *Burm.* Scarce, only met with on the banks of streams in the Pegu Valley, particularly in the Pymmah Choung. Wood dark brown.

58. *Butea frondosa.* Pouk-pin, *Burm.* Plentiful, but the timber is crooked and only fit for ornamental work. Wood dark brown.

59. *Mangifera attenuata.* Tawsa-thayet, *Burm.* Scarce, but found in the Pegu and Tounghoo Forests. Wood dark brown.

60. *Anacardia occidentalis.* Scarce and only found near large towns Wood dark brown.

61. *Zizyphus jujuba.* Hyee-bin, *Burm.* Scarce, only found near large towns, rarely in the Pegu and Tounghoo forests. Wood dark brown.

62. *Averrhoa carambola,* Zoungya. *Burm.* Scarce, and only fond near towns. Wood dark brown.

63. *Pierardia sapota.* Kanayoe, *Burm.* Plentiful in the Pegu and Tounghoo forests, as well as about Rangoon. Wood dark brown.

64. *Ancestrolobus carnea.* Zoungali, *Burm*, and *A mollis.* Yin-bya, *Burm.* Plentiful in the Pegu and Toungloo Forests. The timber grows very tall, but seldom exceeds three feet in girth. Wood dark brown.

65. *Rondeletia tinctoria*, Tamayoke, *Burm.* Small timber, which, together with the last seven kinds, are adapted, from the fineness of their grain and elegance of colour, for ornamental work. Wood dark brown.

Black Woods.

66. *Dalbergia.* Yindike, *Burm.* Of this there are four kinds, all yielding a heavy timber, which will not float, similar to Sissoo. These trees are very plentiful in the Tharawaddy and Hlaine districts, also in the lower parts of the Toungloo district. The timber seldom attains a very large size and is generally found of a girth of three or four feet. Black wood.

67. *Cassia Sumatrana.* Mayalee, *Burm.* plentiful throughout the Hlaine, Pegu and Toungloo Forests. It is the Bombay blackwood Black. wood.

68. *Inga xylocarpa.* Pyin Kadoe, *Burm.* and *I. bijemina.* Tauyen, *Burm.* Two species, affording ironwood. The first is called Pin-Ka-doe by the Burmese. It is found in all the Teak Forests. In the Prome Forests it is usually about six feet in girth, but in all the other forests it attains a larger size, frequently eight or nine feet. It is most plentiful throughout the province. The second species is of smaller girth, but grows to a great height. Black wood.

69. *Diospyros melanoxylon.* Ebony or Oukchinya, *Burm.* This tree is found throughout the forests, seldom however of greater girth than three or four feet. It is very plentiful. Black wood.

Light brown Woods.

70. *Dipterocarpus alatus.* Aing, *Burm* This timber is called in Bengal Battee Sal. It is excellent for every purpose of house-building, especially for posts. It is found chiefly to grow on laterite in the Toungloo and Prome districts. Light brown wood.

71. *Dipterocarpus turbinatus.* Kanyeen, *Burm.* Timber of great size and strength. It is fit for any purpose for which Saul is employed, being of the same family. It is chiefly employed far canoe and boat building. It is found in all the Forest districts, except Prome where it is scarce. Light brown wood.

72. *Shorea robusta* or Saul. Eing-gyeen, *Burm.* This timber is found chiefly on the Shan side of the Toungloo district, and in the Forests north of Toungloo. Light brown wood.

73. *Melicocca trijuga.* Jobin *Burm.*, A most valuable timber, called by the Burmese Kobin, and employed by the natives of the country for cart-wheels, oil-mills, and other purposes requiring great strength and solidity. It is found in greatest perfection on the banks of the Sitan in the Kareen Forests above Toungloo ; but is also found throughout the Pegu and Tou ghoo Forests in abundance, more particularl the latter. It is also found along with Teak i Tharawaddy and Prome Forests. Light brow wood.

74. *Dillenia augusta*, Zinbyewn, *Burm* also *D. scabra.* Byew, *Burm.* and *D. speciosa.* Thabyew, *Burm.* The two first ar plentiful in the Forests of the Pegu district, bu become scarce to the north of it, and the thir species is scarce even there. They all thre afford large and good timber for house building Light brown wood

75. *Hopea odorata.* Thingan, *Burm.* Thi timber, which is said to be plentiful in th Tenasserim Forests, is scarce in Pegu, and few trees are to be found about the vicinity o Rangoon. Light brown wood.

76. *Azadaracta Indica.* Thembau-kamakah *Burm.* or Neem, is plentiful in the Prom district only ; it is a large, but soft timber, onl fit for flooring. Light brown wood.

The above list embraces all the useful timbe found in the Forests of the Pegu Province, except Teak. Besides timber well adapted for house-building, the list contains several promisin kinds that have never yet been fairly tried for ship-building, and which in point of strength are equal to Teak or Oak. The timbers referred to more especially are Nos. 73, 68, 54, 55, 30 and 37, Nos. 25, 23, 19, 14 and 4 are also deserving of trial for ship-building, and No. 56 for any special purposes, where great strength and density are required. Until these trials are decided, the timber employed for house-building purposes should be restricted for other kinds.—*McClelland.*

(8211) *Penang Woods.*

The following Furniture woods grown in Penang or Prince of Wales' Island, were sent by the Singapore Committee to the Exhibition of 1851 ; viz. Siam wood : ebony ; Wild Durian. Uncertain. Augsena wood. Guava wood ; Kamuning, Senna Baymah or Ansena. Mirlimoh, two kinds. Baloh Bunga. Root of Betelnut tree. Root of Cocoanut tree. Clove wood. Root of Eboeh tree, Timbusu, Ranggas, Penang wood, Kulim Baloh, Ibool wood.

These arranged tabularly are,

1. Angsena, or senna Baymah.
2. Balah Bungah.
3. Balach.
4. Baloh.
5. Baloh Bungah.
6. Betel-nut tree root.
7. Clove tree.
8. Cocoa-nut tree root.
9. Durian (wild).
10. Eboch-tree root.
11. Ebony.
12. Guava wood.
13. Ibool wood.
14. Kamuning.
15. Mirlimoh
16. Penang Wood.
17 Ranggas
18. Siam Wood.
19. Timbusi.

Woods of Penang (Col. Frith).

1 Brantey, Light brown colour. An inferior weak wood; used for building

2 Bunho. A large tree; occasionally used for building.

3 Bintagon. A large tree; occasionally used for masts.

4 Curupas, dark red colour. Used for beams of houses.

5 Cooran, light brown colour. Used for planks for building.

6 Chinjeritt, brown colour, specific gravity 2.165. A small tree; used for furniture.

7 Cumpas, light brown colour. A large ree; used only for planks.

8 Cawa-Arang, pale brown colour. A very arge tree; used for furniture and ornamental work.

9 Canis. A large tree; used for door frames.

10 Chiuracy, brown colour, specific gravity 1.081. Used for beams; does not work kindly.

11 Cawa-Arang, light brown colour. Only used for furniture.

12 Cocoa-nut, brown colour. Cut perpendicularly.

13 China red wood, red colour. Only used for furniture.

14 Ceylon ebony, black colour. Used for nlaying and ornamental furniture

15 Damarlout, brown colour. Used for building and general purposes.

16 Dunorhung, brown colour, specific gravity 1,235. Used by the Chinese for carved images.

17. Drum, light brown colour. A very small ree; used for ornamental furniture.

18 Hama Raja. A very small tree little used.

19 Maddang Kamenhir. Used by the Chinese for making boxes.

20 Miraban, light red colour. Much used for ship-building, furniture, &c.

21 Maddang Tandack, dark brown colour. Not used at all.

22 Maskaw, light brown colour; specific gravity 1.016. Used for plankeens, carriages, furniture &c.

23 Mankadu, brown colour. A species of Damarlout much used for beams.

24 Maliler, white colour. A small tree; used for work boxes and ornamental work.

25 Maribot, purple colour; specific gravity 0.939. A very large tree, difficult to work: used for furniture.

26 Mandara, pale red colour, specific gravity 0.939. A small tree; used for ornamental furniture.

27 Nebong, dark colour. A tall and thin, but straight tree; used for railings.

28 Papisrang, pale brown colour. Six to nine feet in circumference, forty feet long; not good for beams; chiefly used for furniture.

29 Pasa Linija, light brown colour. A large tree; used only for planks; soon decays.

30 Pala. A tall thin tree; used for planks.

31 Pinang Bach, brown colour. A large tree; used for beams.

32 Pala Utan, light brown colour. A large tree; only used for planks.

33 Papisrang, purple colour. A strong wood; used for beams.

34 Penang Teak, brown colour. Scarce now.

35 Penang Jack, yellow colour. Used only for ornamental furniture.

36 Raugha as, light brown colour. Used for furniture.

37 Rokam, light red colour. Used for boxes and furniture.

38 Red wood, red colour, specific gravity 1.000. In general use for furniture.

39 Sanknang, pale brown colour. Used only for ornamental work.

40 Satin wood, straw colour. A beautiful wood for ornamental furniture &c.

41 Siam ebony, black colour. Used only for ornamental furniture inlaying &c.

42 Teak, brown colour. In general use.

43 Tampinnis, light red colour. A fruit tree; used for ornamental furniture, billiard cues, &c.

44 Tija, light brown colour. Used for furniture boxes &c.

45 (No name), purple colour. Not durable; used for all sorts of rough work.

(8212) *Sinde. The forests of Sinde.*

During our sojourn in this Province we have often been struck with the beautiful and magnificent appearance of some of the Forests which are to be found scattered througout the country, particularly those in Lower Sind—the greater number of which are planted—not actual Forest. We need but ask our readers to pass over the Hills from Sonda en route to Jerruck, where beauty in its richest garb awaits them far beyond our description, with the noble river seen at the distance winding its way as it were through these gigantic woods; amazement here stops the traveller to enquire how scenery so transparently beautiful was ever formed for such an arid waste as Sind is supposed to be. We do not mean to say that there are not other parts equally picturesque; we know there are—but we allude to this spot from its proximity as well as to our remembrance of the "first inpression" made years gone by, and which have been confirmed by subsequent visits year after year.

These Forests, under the rule of the Ameers, were mere hunting preserves, and were admirably adapted from the thickness of their underwood for the cover of wild animals of every sort, and no one but their keepers were allowed to enter them. No attention whatever was paid to their Timber, in fact they were hunting grounds *in reality*, and death to the man, in those days of oppression and tyranny, found in them, killing the " Lord's game."

From statistical Reports before us we gather that the Forests in number amount to about 72, including the Forest jungles in Upper Sind (not walled in like those in Lower Sind) of Bhan or Poplar, which spring up spontaneously on the river bank when the inundation subsides. The Forests cover an area of about 1,59,688 acres, in the cultivation about 34,555, wasteland 55,385, and wood area 69,753.

The products of the Forests are Timber, Firewood, Charcoal, Gum Lac, Bark, Baubul Seeds, Grass and Reeds for Mats. The common woods found are Baubul, Bhan, Kunda, Tali, (Sissoo of Upper India) Tree Tamarisk, Jamul, Sirme and Mountain or bitter Neem.

The Baubul is very abundant and grows to a very large size. It is exceedingly hard and weighty. For agricultural implements and all native purposes it is excellent. It is also much used, we are informed, by the Indus Flotilla, for paddle flats, rudders, stanchions and boats' knees—in fact we believe it is used, for every purpose to which wood can be applied. Besides other parts of the Baubul are used, its bark is employed in tanning, its pods form a valuable food for the cattle, its young branches are the favourite food of camels and goats, its bark yields gum and lac, and for all these articles, wood, bark, pods and lac, a sale is always found.

The Kunda or Prosopis is very plentiful and only used as firewood.

The Bhan or Poplar is only used for rafters and turning work. It is nowhere to be found in the Bombay Presidency.

The Sirree or Madras Blackwood, the Tales or Blackwood of Upper India, the guz or Tree Tamarisk, are found in many of the Forests, but in small numbers.

The products of the Forests above enumerated are all consequent on our occupation of the country, and have conferred inestimable blessings on the people

The grazing alone is much appreciated by the natives from its shade, and brings in a Revenue of between 8 to 9 thousand Rupees per annum. The supply of fuel to the Indus Flotilla must be enormous, 90,000 maunds per annum, and then there are the other products, giving we should say, a gross Revenue of not less than 20,000 Rupees, or thereabout. This in our opinion is underrating the Revenues of the Sind Forests, altho' it is said they are yearly diminishing in size from their being washed away by the encroachments of the river and from the Canals, which runs through them, not being cut as they used to be during the time of the Ameers, to admit water for watering the trees.

The superintendence of the Forests has passed through many hands since the beginning, but we believe none gave so much satisfaction as did Dr. Stock while they were under his management. For works of this description where improvements are so invaluable to the Revenues, men of first rate abilities are necessary. Botanical attainments as well as a general acquaintance with the prevailing Revenue system is desirable.—*Scindian*, *July* 12. 1856.

(8213) *Singapore Woods, or Malay Woods, being woods from Singapore.*

This collection, at the 1851 Exhibition, consisted of about one hundred specimens, many having no labels; those marked are as follows:

1 Angsanah.
2 Biliong.
3 Biliong Wangi,
4 Bras Bras.
5 Bitangor Wood.
6 Changis.
7 Glam.
8 Jambu-ayer-utan.
9 Kayau Arang.
10 Kamuning.
11 Krautai.
12 Arangi.
13 Arangi Klat.
14 Kayu Brombong.
15 Kledang.
16 Lakah wood.
17 Leban
18 Meosbon
19 Medansi Miniak.
20 Medansi Buah yeah.
21 Medansi Tandoh.
22 Medansi Kitanahan.
23 Medansi Konit.
24 Polai wood.
25 Peragah.
26 Ranggas,
27 Simpoh Ryah.
28 Simpoh brekit
29 Slumar.
30 Tan Pang.
31 Tampinis.
32 Timbusu.

Of these "Binlangor" wood is the most used especially in ship building, serving for planks, masts, spars, &c. it grows in the greatest abundance round Singapore, and is largely exported to the Mauritius, California, &c.

The "Glam" tree, furnishes a paper-like bark, used in caulking the seams of vessels.

The wood of the "Polai" tree, which is used to make floats for fishing-nets, is a very remarkable light, white wood, and might probably be imported and used with advantage as a substitute for cork, and some similar substances.

(8214) *Tavoy. Timber Trees and Woods of Tavoy.* (*Dr. Wallich.*)

1 Acacia, Popeeah, *Burm.* A very large tree, used for posts and rollers

2 do Paingadoo, *Burm.*

3 Anacardium, Thubbamboo, *Burm.* A large tree, used in boat building.

4 Artocarpus, Thouenben, *Burm.* Do do do.

5 do A large tree.

6 do Pynyathe or tannabeng, *Burm.* Wood not used

7 Bignonia, Thathee, *Burm.* A very large tree.

8 do (?) Thuggainee *Burm.* A large tree used in building.

9 do Lainbha *Burm.* A middle-sized tree.

10 Calophyllum, Turra-phee, *Burm.* Used for masts &c.

11 Carapa, Taila-oon *Burm.* Used in building.

12 Careya, Kaga, *Burm.* Large timber tree.

13 Castanea Martabanica. Norne or zitha, *Burm.*

14 Cerbera Manghas, Kullooa, *Burm.* Wood not used.

15 Dillenia, Zimboon, *Burm.* Used in building.

16 Diptcrocarpus grandiflora. Ain or aintha, *Burm.* An immense tree.

17 Do. Do. Do. Kunnean phin, *Burm.* Used as timber.

18 Euphorbiacea. Yamula, *Burm.* Used for frames of lacquered ware.

19 Eurya. Thaun, *Burm.* Used for fuel only.

20 Excoecaria ? Thurrotha, *Burm.*

21 Ficus. Thubboo, *Burm.* Used in house arpentry.

22 Do. Do Do. Thuppan, *Burm.* Large ree ; wood not used.

23 Garcinia. Pulloua, *Burm.* Large tree, used or posts, &c.

24 Grewia. Miaya, *Burm.*

25 Heritiera Fomes. Kunnazoo, *Burm.* Very arge tree ; very hard and durable wood.

26 Hibiscus macrophyllus. Used in building.

27 Do. Do. (?)

28 Hopea floribunda. Tantheya, *Burm.* A very arge tree.

29 Lagerstroemia. Kuennounee or puma, *Burm.* Used in building.

30 Laurus. Kullowa or Kurrowa, *Burm.*

31 Do. Panatha, *Burm.* Used in house-arpentry.

32 Do. Maythen, *Burm.* A large tree, good useful wood, much used.

33 Do. Keemna, *Burm.* Small tree, used for posts

34 Laurus. Thuggoo, *Burm.* Used for oars, c.

35 Do. Thitya, *Burm.* Very large tree, used in building, &c.

36 Do. Kayzai, *Burm.* Used in house-carpentry.

37 Mimusops, Thubbae, *Burm.* Used in ship-building

38 Do. Elengi.

39 Murraya. Maikay, *Burm.* A tough close grained wood, used for handles.

40 Myristica, Thounsanga, *Burm.* A large ree, used in boat-building.

41 Do. Koathoe or Kunneen, *Burm.* A arge tree, used in flooring houses

42 Osyris peltata, Phaoun, *Burm.*

43 Pierardia, (?) Kunna or Kuzzo, *Burm.*

44 Pinus Dammara, *Burm.* A very large tree, used in building.

45 Pterocarpus, (?) Puddow, *Burm.* A large ree, used for furniture, &c

46 Rottlera, Mimasko, *Burm.*

47 Do Keoun lae, *Burm.* A large tree. used for rudders, &c.

48 Sandoricum, Thittoo, *Burm.* Used for furniture.

49 Sapotca, (?) Palaepean, *Burm.* A very arge tree, used in building.

50 Sonneratia, (?) Thaumma, *Burm.* A small tree.

51 Sterculia, (?) Kunnnu, *Burm.* An enormous tree.

52 Do. Thikadoo, *Burm*

53 Symplocos, (?) Kain-tha-phogee, *Burm.* Used in boat-building

54 Syndesmis Tavoy and, Ka-tha *Burm.* A very large tree, used for building, boxes, &c.

55 Do. Do. Kunnun keunka ; Kunuun keunla, *Burm.* Used for beams, posts &c.

56 Terminalia. Thuphanga, *Burm.*

57 Ternstroemia. Puzzeen zwa, *Burm.* A large tree, used in building.

58 Uvaria. Thuhbor, *Burm* A large tree, used for boat building.

59 Wrightia antidysentrica. Lathou, *Burm.* Small tree, not used.

60 Xylocarpus. Keannan, *Burm.* Very durable timber.

61 Zizyphus. Zeethee, *Burm.* Hard and durable wood.

62 ———? Ahnaun, *Burm.* Strong, hard and very durable timber, used in ship building.

63 ———? Bah-mah-thoa, *Burm.* Useful timber.

64 ———? Con-moo *Burm.* Good timber, used for building houses and boats

65 ——— ? Kaantha, *Burm.* A small but valuable wood.

66 ———? Kaungo-kurrs A heavy but durable wood, used in boat building : specific gravity 0.690.

67 ———? Keahnaun, *Burm.* Strong crooked wood, used for stocks.

68 ———? Kuddoot alain, *Burm.* A large tree, used in house and ship building.

69 ———? Kuddoot-nu, *Burm.* Inferior wood, used in boat building.

70 ———? Kummi, *Burm.*

71 ———? Mainaban, *Burm.* Used for bows, lances, beams, rafters &c.

72 ———? May-klin, *Burm.* Used for rudders and anchors.

73 ———? May-maka, *Burm.* Used in ship-building

74 ———? May-rang, *Burm.* Said to be very durable.

75 ———? May-tobek, *Burm.* Used for the bottoms of ships ; preferred to teak

76 ———? Megeone, *Burm.* A large tree used in building.

77 ———? Penlay-peen, *Burm.* Used in building.

78 ———? Piennahne, *Burm.* Yields very strong knee-timber.

79 ———? Pienmah pue, *Burm.*

80 ———? Tantheya, *Burm.*

81 ———? Tanguet-na, *Burm.*

82 ———? Teatha, *Burm.*

83 ———? Thanga-et thittoo, *Burm.* Inferior wood.

84 ———? Than-baunpo, *Burm.* Inferior wood, used for common canoes.

85 ——— ? Thau baun than-lay, *Burm.* Very flexible wood.

86 ———? Theyah, *Burm.* Inferior wood.

87 ———? Thounmynga, *Burm.* Used in building.

88 ——— ? Thymbro, *Burm.* Good strong durable wood, used in boat building.

89 ———? Town pine, *Burm.* Good wood, used in boat building.

(8215) *Tavoy, being Woods of Tavoy (by Mr. Blundell,) Commissioner.*

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1 Annan. A small tree; used for building.

2 Bep-than. Used for building.

3 Bep-won. Used for building.

4 Bhan-bhway. Used for house posts; like sisoo

5 Bha-ta-ka. Used for common carpentry.

6 Daup-yan. Used for building.

7 Eng-beng. Strong wood; used for common carpentry.

8 Kad-wot-nu, Cedrela ? *Burm.* Used for house and ship-building : large timber, 40 to 70 feet ; specific gravity 1.060.

9 Kanna-tso. A very tough close-grained wood.

10 Ka-nyeng kyaung khyay. Used for boat, ship, and house building ; yields an oil ; not attacked by insects.

11 do do do do rather shaky.

12 Ka-nyeng-pyan. A heavy, grey wood ; used for handspikes.

13 Katso Like toon ; used in building &c.

14 Kaung-thmoo-ysepsay A rough, strong wood ; used for posts. &c.

15 Kengthep-guyung-ywept A light, inferior wood ; used in building.

16 Kengthep-pheoot-kyay. A sound small wood ; used in building.

17 Khamoung-nee. Heavy wood, not attacked by insects.

18 Khamoung-pyion. Small sized, compact, yellowish-grey wood.

19 Kharaway-nu. Porous, heavy, strong wood, not attacked by insects.

20 Kouk-ko. Employed for bottoms of boats.

21 Kyay-tsay-gyn-khy-ay. A heavy, compact, dark wood ; suitable for gunstocks.

22 Kyay-tsay-bayonn. Useful for common carpentry.

23 Kyep-yo. A kind of teak.

24 Kywon-bo. A soft wood like the nauclea.

25 Kywon-ma, do do ; a variety.

26 Lienman. A small tree ; heavy, close-grained, light colored wood, like terminalia.

27 Mala-ka. Small sized, strong wood ; useful for handles.

28 Ma-yam. An indestructible, strong, heavy, dark red wood.

29 Mee-kyaung-kyay· A heavy wood, not attacked by insects.

30 Meep-thua-ban. A small-sized, compact grey wood ; used for handles, &c.

31 Miaup-bout. Used for furniture, &c

32 Mya-kamaun. A valuable strong blac wood ; used for knife handles.

33 Myeng-ta-bep. A strong, blueish-gre wood ; adapted for handles.

34 Ngoo-beng A strong wood ; used fo posts and planking.

35 Noalee-lyeng. A close-grained, strong heavy wood ; useful for handles.

36 Pan-loun. A close grained red wood used for building.

,37 Pantheet-ya. A good white rough wood useful for boat building.

38 Patseng-tsway. Small sized strong wood

39 Patseng-ngo. A superior high-coloured aromatic wood, like mahogany.

40 Peng-lay-byun. Small sized tough wood.

41 Peng-lay-oun. Strong, rough, red wood like Mimosa serissa.

42 Peng-lay-kaboay. A heavy small sized wood ; suitable for handspikes, handles. &c.

43 Pee-daup. Mimosa. *Burm.*

44 Pinnay. Artocarpus. *Burm.* Strong, close grained yellow wood.

45 Pyaung-pyion. A compact, heavy, yellow wood.

46 Pyeng-khado. Small sized, heavy, close-grained, red wood.

47 Tag-nyeng. A useful furniture wood.

48 Ta keep-nee. A very strong, close grained, heavy, light coloured wood.

49 Tha-bhan. Used for canoes.

50 Tha byay-nee. A strong, close grained, brownish grey wood ; used for house posts.

51 Tha-byoo. A heavy close-grained wood.

52 Theet-ta-gyee. Suitable for common carpentry.

53 Theet-ya-han. A close-grained teak, used for posts.

54 Theet-ya-nee. A close-grained brown wood ; rather shaky.

55 Theet-ya-pyion. A heavy strong wood.

56 Thiem. A serviceable wood.

57 Thingan-kyaup. A close-grained, heavy, strong wood ; used in ship and house-building, for carts &c.

58 Thmeng-ba. Like red Jarool ; used for posts and cotton-rollers.

59 Thmeny-tshout. A small, heavy, coarse, brown wood ; used for door frames and boat beams.

60 Toung-bhaut. Rough, knotty wood ; used for knife and spear-handles.

61 Toung-bhien. A light, porous wood ; used for common carpentry.

62 Toung-byeng. A kind of red saul.

63 Toung-byion. A close grained, brown, shaky wood.

64 Toung-kha-ray. Red Jarool; used in oat building.

65 Tseng byion. A compact greyish-brown ood; suitable for common carpentry.

66 Tsoay-dan. Used for gun-stocks

67 Wonthay-khyay. A small, strong, com-act, yellowish-white wood.

68 Yow-ma-lay. A strong, heavy, rough, white ood; used for house-posts.

69 Zoo-lat. A small, heavy, compact, yel-owish-white wood.

(8216) *Tinnevelly. Woods of Tinnevelly by olonel Frith.*

1 Arrava. Pentaptera, Light brown colour. sed for building, handspikes, tools, &c.,

2 Anttee, Red colour. Used for furniture.

3 Augenecpelah, Brown colour ; specific gra-ity 0.484. General work.

4 Cangoo, whitish brown colour. Hand-ikes and wheel wright's work.

5 Eloopay, Red colour. Building in general.

6 Hill teak, Light brown colour. General urposes.

7 Karootauley, Black colour. Fancy work.

8 Koongheelyara, Light brown colour. Used r building purposes ; yields dammer.

9 Kotamaram, Brown colour ; specific gravity .723. Building in general.

10 Mookersey, Red colour. Building in ge-eral.

11 Munjet Kerddumpah, Light straw colour. uilding in general.

12 Mathgirie vamboo, whitish brown colour. strong light wood ; used for general purposes.

13 Marootho, white brown colour. Building general.

14 Mathgiric vamboo, old ; Red colour. A rong light wood.

15 Naungoo, Red colour ; specific gravity 1.009. sed for building, wheel wrights work, hand-ikes.

16 Nuffell ; Red colour ; specific gravity 0.717. uilding in general.

17 Nelly, Light-brown colour. Building in eneral.

18 Nurryveroosoo, Whitish brown colour. uilding in general

19 Nagakunny, Whitish brown colour. Build-g in general.

20 Oonnay, Red colour ; specific gravity 0.928 strong wood, used for wheelwright's work, ndspikes.

21 Oosulay, Light brown colour ; specific ravity 0·832 ; building in general.

22 Polava, Light brown colour. Musket-ocks, and building purposes

23 Paulay, Deepstraw colour. Fancy work.

24 Pooversoo, Red colour ; specific gravity .860 Used for making bandies.

25 Poupathera, Whitey brown colour ; specific gravity 0.683. Used for building purposes.

26 Poonnay, Deepstraw colour. Used for building purposes.

27 Poovey, Light brown colour ; specific gravity 0·840. Used for building purposes.

28 Paselay, Whitey brown colour. Used for furniture.

29 Sammerm, Red colour. Furniture of any description.

30 Sarakontay, Whitey drown colour. Building in general

31 Sampayapaulay, Light brown colour, specific gravity 0·792. Building purposes.

32 Thothakutty, Red colour. Furniture of every description.

33 Thunnaka, Whitey brown colour. Making trunks.

34 Thokay, Red colour ; specific gravity 0·950. Building purposes.

35 Yangy, Light brown colour. Wheelwright's work.

36 Yakauley, Light brown colour. Building in general.

37 Vamboo, Light straw colour ; specific gravity 0·795. Building in general.

38 Vankay, Light brown colour ; specific gravity 0·888. Building in general.

39 Veroosoo, Whitey brown colour. Building in general.

40 Vakanatty, Whitey brown colour, Building in general.

41 Vemmarm, Brown colour ; specific gravity 0·786. Building in general.

(8217) *Travancore. Woods of Travancore by* (*Colonel Frith*)

1 Ahguilb. Light yellow colour, specific gravity 0.674. Very abundant ; used for furniture.

2 Attoo vunjee. Amber colour, specific gravity 0·480. Very cheap ; used for firewood.

3 Aranellah. Dark brown colour, specific gravity 0·645. For building common houses.

4 Chinny. Rather dark colour, specific gravity 0·515. From 8 to 16 feet in circumference ; used for building canoes.

5 Cherrotimba. Dark colour, specific gravity 0·843. About 3 feet in circumference, used for house building, tools &c.

6 Cherrotanny, Light colour. Firewood.

7 Carcemaradoo Dark brown colour, 2 to 6 feet in circumference ; used for carts and building.

8 Chorocadamboo, Yellow colour, specific gravity 0·529. Used for packing cases.

9 Chitta linny. Red colour, specific gravity 0·847, 1 to 1½ feet in circumference ; used for furniture.

10 Cherro vunjee, Browncolour, specific gravity 0.644. Used for firewood.

11 Cherro nalampella, Light brown colour, specific gravity 0·483. For making canoes.

12 Cherro canny, Light brown colour. Only for firewood.

13 Cunda lah pallah, Bamboo colour. For making sandals.

14 Channy marm, Brown colour. For building common houses.

15 Channy vengah, Light yellow colour, 1 to 6 feet in circumference. House building.

16 Carrimarriddy, Dark colour, 1 to 4 feet in circumference ; used by wheel wrights.

17 Cherropoona, Dark colour. Building houses.

18 Conjah marm, Red colour. Furniture, &c.

19 Conjee marm, Light red colour, specific gravity 0·650. Furniture, &c

20 Channee, Brown colour, Used for oil-mills, &c.

21 Dhannee, Dark colour, specific gravity 0·733. Very strong, but knotty, used for common buildings.

22 Ellahneel, Light red colour, specific gravity 0·779. A small tree, used for temples, pagodas, and furniture.

23 Eramboo, Dark brown. For common houses.

24 Jackwood, Yellow colour, specific gravity 0·554, 2 to 4 feet in cirumference, strong wood ; used for furniture.

25 Kulleutake, Brown colour, specific gravity 0·749. Buldings, wheel wright's work, &c.

26 Karanchilly, Dark colour, specific gravity 0·519. Buildings and small boats.

27 Kyeattee, Ash colour, specific gravity 0·972. Carts and buildings.

28 Kanjarum or nux vomica, Ash colour, specific gravity 0·796. For making cots.

29 Karity, or black wood, Black colour, specific gravity 0·948 ; 2 to 4 feet in circumference, strong wood, used for furniture.

30 Kaujarom, Ash colour. Used for common building.

31 Marya cadamba, Yellow colour. Used for packing-cases.

32 Moolu venga, Copper colour, specific gravity 0·831. Used for common buildings.

33 Masoodah, Ash colour, 2 to 8 feet in circumference ; used for building

34 Myle Ella, Ash colour. Used for carts, buildings &c.

35 Mally velly ravah, Light brown colour, specific gravity 0·664. For building houses only.

36 Munjaddy, Purple colour, specific gravity 0·667. For building houses only.

37 Myle ellah, Light green colour, specific gravity 0·896. For building houses only.

38 Manny marootha, Flesh colour. For carts and building houses.

39 Magadamboom, White colour, specific gravity 0·462. Used for light work generally.

40 Munny martha, Brown colour specific gr vity 0·607. 1 to 6 feet in circumference ; use for furniture.

41 Manja cadamboo, Light yellow colou Used for packing-cases.

42 Muttalla, Brown colour. Used for ligl work.

43 Neelahampellah, Light brown colou Used for house building, ceilings, &c.

44 Nauamboo, Brown colour. Used for common buildings.

45 Neelumpallah, Light brown colour. Use for light work

46 Nurmanjee, Bamboo colour. Used fo light work.

47 Nurmarithy, Brown colour, specific gravit 0·615. Building common houses.

48 Nulampallah, Dark brown colour. 2 to feet in circumference, and 30 feet long ; used fo common houses and carts.

49 Odoorah venga, Dark brown colour, specific gravity 0·853. 4 feet in circumference, and 4 feet long ; a strong good wood, used for wheels gun carriages, &c.

50 Oddysaga, Dark brown colour. Used fo common building purposes.

51 Oddamarm, Dark colour. 3 feet in circumference, used for tent-pegs, mallets, &c. very strong wood.

52 Paul-teak, Brown colour, specific gravity 0·739. Used for furniture, gun-carriages, &c.

53 Poon. Brown colour, specific gravity 0 623, 2 to 4 feet in circumference and 80 feet long ; used for masts.

54 Pongah. Brown colour, specific gravity 0.988. For building houses.

55 Poolyetty. Black colour, specific gravity 0.858, 2 to 8 feet in circumference, strong wood ; used for furniture.

56 Poody vaga, Brown colour, specific gravity 0.400, 4 to 10 feet in circumference, 40 feet long ; strong, never splits ; used by wheelwrights.

57 Ponghu, Brown colour ; specific gravity 0.960, 3 feet in circumference, used for building.

58 Thevahdarum, or cedar wood, Flesh colour, specific gravity 0.457, 2 to 8 feet in circumference, used for palanquins, cabin fittings, furniture &c.

59 Tharanchilly, Bamboo colour, 5 to 8 feet in circumference ; used for canoes only.

60 Tekkeer attovye anjelly. Brown colour, specific gravity 0.528, 4 to 6 feet in circumference ; used for house and ship building.

61 Tharanjulla. Bamboo colour, specific gravity 0.576. Used for common building.

62 Tambagum. Brown colour, specific gravity 0.910, 5 feet in circumference ; very strong wood ; used for houses, blocks &c.

63 Venpalla. Ash colour. Only used for carved figures, sandals &c.

64 Vatanboo, Brown colour, specific gravity 0,434. Only used for firewood.

65 Vatanboo. Light Brown colour, 2 feet in circumference ; used for railings, fences, &c.

66 Varoodah. Yellow colour, specific gravity 0.855. Used for building houses.

67 Velha ahguill, Light brown colour, 2 to 4 feet in circumference ; used for furniture.

68 Veytty. Light brown colour. Used for making carts. ceilings, &c.

69 Vaimboo, flesh colour, specific gravity 0.483, 2 to 4 feet in circumference ; used for tables &c.

70 Vellah ahguill, White colour, specific gravity 0.602, 2 feet in circumference ; 50 feet ong ; used for furniture.

71 Vella carduntha, Brown colour, 3 to 6 feet in circumference, 40 feet long ; strong wood ; ised for furniture.

72 Velty marm, Purple colour, specific gravity 0.623. Used only for firewood.

73 Vataloo. Purple colour. Used only for irewood.

74 Velty taddy, Brown colour, specific gravity).635. Used only for firewood.

75 Vanpuggalah, Light yellow colour, specific gravity 0.604. Used for light work.

76 Vutty marithy, Brown colour, specific gravity 0.595. Building common houses.

77 Vuddamba, Brown colour, specific gravity) 750. Building common houses.

78 Vally canjarm, Brown colour ; specific gravity 0.703. Building common houses.

79 Vellaneermaradoo, Light yellow colour ; pecific gravity 0.573. Used for furniture.

80 Vellallva, Brown colour. Used for light vork.

81 Yuttamba, Brown colour. Used for building houses, and light work.

These Travaneore woods as well as collections rom Palameottah, from Paulghaut, from Tinneelly, from Canara and from Penang, were selectd and sent to Britain by the late Colonel Frith ; hey were exhibited at the London Exhibiion of 1851 by Lieutenant Colonel Bonner, Miliary storekeeper of the Honorable East India Company.

(8218) TIN.

Rescas, Abruz. Arab.
ang-seih, Chin.
in, Dut.
erblanc, Fr.
Bleeh, Weissbleeh, Ger.
Kullac Ranga, Kuthail, Guz. Hind.
Latta Banda Stagnata, It.

Timmah Jav.
Stannum, Lat.
Tima, Falagh. Mal.
Urzeez, Pers.
Blacha, Rus.
Trapu, Sans.
Hoja de lata, Sp.
Tagarum, Tam.
Kalai, Turk.

Tin is one of those metals which were earlist known, though it occurs in comparatively ew countries. The acquaintance of the ancints with this metal, though it does not ccur in the native state, is accounted for by he circumstances that the ore is found frequenty near the surface, and is easily reduced by charcoal and a moderate degree of heat to the state of metal. According to Berzelius, Tin is found in England, Saxony, Bohemia, Hungary, the Isle of Banea, the Peninsula of Malaeea, in Chili, and Mexico. Malacca furnishes the purest tin, and Cornwall the largest quantity. Tin occurs in two states of combination, the peroxide and double sulphuret of tin and copper : this last is rather a rare substance, and it is from the former that the metal is almost entirely obtained. The Peroxide of Tin is found in Cornwall in two forms :—1. In veins in primitive countries, where it is intimately mixed with several other metals, as arsenic, copper, zinc, and tungsten : this is common *Tinstone*. 2. In loose rounded masses, grains, or sand in alluvial soil, in which state it is called *Stream-Tin*. The former, when reduced to the metallic state, yields *Block-Tin* ; while the latter yields *Grain-Tin*, which is the purer of the two. The massive varieties of Oxide of Tin are called Stream-Tin. What is termed *Wood-Tin* is found in reniform and botryoidal masses, or in wedge-shaped pieces, which have arisen from their partial destruction : the surfaces are generally water-worn. Wood-Tin exhibits various shades of brown, which sometimes appear in concentric bands, giving it a ligneous appearance, whence its name. Stream-Tin has evidently been derived from the destruction of tin veins or lodes, the lighter portions of stony matter having been carried away by the water, which has rounded the fragments of the ore. —*Eng. Cyc* Tin is mentioned by Moses under the name Bedel. It was used by the Egyptians, probably obtained from the East by the trade with India. The Greeks and Romans obtained it through the Phœnicians from England. It abounds in Cornwall, and in the Eastern Archipelago, from Mergui to the island of Banea. It is brought into commerce in the form of Grain Tin and Block Tin. Malaeea Tin and Banea Tin are the Eastern varieties ; to these Mergui Tin has lately been added.—*Royle.* It exists in large quantities in the Malayan Peninsula, as well as in Banca, Borneo, and many other islands. Tin, we know, was employed by the Egyptians, because it formed an ingredient in some of their metallic compounds ; but its use has long been familiar to the Hindoos for forming various metalurgical compounds, as well as for tinning copper. As it occurs as an oxide, and near the surface of the soil in large quantities, and requires only charcoal for reducing it, we may suppose it would easily have been discovered by a people who forged iron and made steel. As the nations of antiquity employed it for hardening copper, and used the alloy for forming swords and spear heads, so the natives of India form various compounds with copper and tin, which are remarkable for their hardness, and for the fine sounds, which they emit on being struck. Dr. Wight lately found that an alloy of ten grains of copper to two and a half grains of tin was the best mixture which a native made in his presence. British spear heads are found to consist of one of tin to ten of copper, and a knife, of one of tin to seven and a half of copper. Mr. Aikin, in his experiments, found that eight grains of copper to one of tin formed the hardest alloy.—*Royle, Arts of India, page* 470.

Tin is abundant in the Tenasserim Provinces, commencing from the mountains in which the Tavoy and Henzai rivers have their rise, the northern limit of tin in the Provinces, to the southern boundary of Mergui, Pakchan river. The richest locality in the Province of Tavoy, is nearly opposite the city of Tavoy on the eastern side of the mountains. That large quantities of tin must have been found in Tavoy three hundred years ago, we have evidence in an incidental remark from Mr. Ralph Fitch; who, says Mr. Hough in the Maulmain Chronicle, "travelled in this part of the world in about the year 1586, or 1587." He says: "I went from Pegu to Malacca passing many of the sea ports of Pegu as Martaban, the Island of Tavi whence all India is supplied with tin, Tenasserim, the island of Junkselon, and many others." Captain Tremenheere found the richest deposit of tin in the Provinces, at Kahan on Mergui Island, about eleven miles above the town, and near the Tenasserim river. "Kahan itself," he writes, "is the highest portion of a low ridge of hills, not more than 200 feet above the level of the river: it is composed of a soft friable white sandstone rock, the upper portions of which are decomposed and irregular. The surface gravel does not contain tin. It is found in the crystallized form interspersed in decomposed granite, forming a vein about three feet wide, which is enclosed by the white sandstone rock, and dips down at a high angle with the horizon. "Large scales of chlorite occur with it, which, as they are generally found where the tin is most abundant, is called by the natives 'the mother of tin.' The face of the hill is in one spot scattered over with these, which appear to have been brought down from the vein with other matter from which the tin has been separated by the usual mode of washing. It will be noticed, that the granite is completely decomposed, and that the crystals would be easily separated by washing. No tin has been raised here since the country came into our possession, but the locality has been known. It was worked during the Burmese rule, and valued as supplying the richest ore of tin. A Burmese residing near the spot, pointed out the place where his operations had ceased. He had followed the direction of the vein alluded to, as well as he was able, and had driven a gallery under ground in an inclined direction upwards, till the bank above fell in, when the mine was abandoned. He stated that he had procured considerable quantities of tin daily, and that he often found it in large masses mixed with yellow ground. Arriving at the spot where his work had terminated, I set people to excavate and find, if possible the vein which had been described. It was reached after about two hours' digging, at the depth of five feet from the surface of the cut in the hill in which we stood. In about a quarter of an hour, a few baskets of the decomposed granite were removed down the hill, from which an amount of the crystallized peroxide of tin, equal to 63 176 grains of pure tin, were collected. "The crystallized form in which the ore is here found renders its separation extremely easy, and the whole processes of stamping and dressing, which in England are tedious and expensive operations, can thus be dispensed with. No arsenic or sulphur being mixed with the ore, it need not be roasted before it is placed in the furnace." This ore he adds, as quoted by Mr. O'Riley, "contains specimens of macled crystals, which in weight and size surpass any thing I have ever seen in Cornwall or in cabinet specimens. Specimens have been extracted of great weight and richness, consisting of large macled crystals of tin on quartz, and containing more tin in proportion to the bulking than any specimens I have before seen. The largest, which measured about fourteen inches square by twelve deep, was so heavy, as to require some exertion to hold it steady in both hands." In another report, Captain Tremenhere writes: "With the view of ascertaining its value in the home market, I transmitted, a box of average samples of the ore, to a smelting establishment in Cornwall, (Messrs. Bolitho and Co.) having extensive connection with the tin mines of that country. In April 1843 Mr. Thomas Bolitho informed me that—'The samples of once-washed ore produce about 70 per cent. of tin, and the twice-washed yields nearly 75 per cent. The metal is very good, being almost free from alloy; some of the samples which have been sent to me from the Malayan peninsula contain titanium. The ore appears to separate from the matrix very easily. The consumption of tin throughout the world increases so slowly, and the supply at present being more than equal to the demand, there is little inducement to speculate in tin mines. The produce of Cornwall is 6,000 tons per annum, and we calculate that the quantity produced at Java together with what is raised in the Malayan peninsula, will rather exceed the produce of Cornwall. The average price of tin in Cornwall has been about 72s. per cwt., but it is now as low as 56s., which is the present price of the best Straits tin, and tin mines are suffering greatly from the depreciation in the value of their metal. It may serve for your guidance to know, that at this moment tin ore of the description of the sample twice washed, would fetch in

England about £ 46 per ton.' "The following calculations of the probable result of a shipment of tin ore and of the metal, have been obligingly made by two mercantile gentlemen of Maulmain. They are based on the lowest prices which, according to Mr. Bolitho, were obtainable in the market in April 1843, and show a probable profit on tin ore of 7s. 8d. per cwt. ; but a loss on shipment of the metal of 12s. 4d. per cwt. in one case, and 4s. 9d. per cwt in the other.

				£.	*s.*	*d.*
45 Rs. per $^{\circ}/_{0}$ viss=per cwt. 14 Rs. or				0	28	0
Charges.	£.	*s.*	*d.*			
Duty, ...	0	3	0			
Stout boxes and shipping charges in Maulmain, ...	0	1	0			
Freight home £ 2 per ton, ..	0	2	0			
Insurance 2½ per cent on 40*s.*	0	1	0			
Commission and London charges 5½ per cent.. .	0	2	2			
Interest commission per 5 cent on purchase, ...	0	1	2	0	10	4
				0	38	4
Sale price per Mr. Bolitho, ...				0	46	0
Leaves a profit per cwt.				0	7	8

July 1843. *Tin* from Maulmain purchased at 77 rupees per hundred viss.

				£.	*s.*	*d.*
77 Rs. per cent viss.=23 Rs. 14 annas or per cwt... ...				0	47	9
Charges.	£.	*s.*	*d*			
Duty, ...	0	10	0			
In Maulmein shipping, &c. per cwt.	0	0	6			
Insurance 2½ per cent or 6 per cent...	0	1	0			
London charges, viz. commissions 2½ per cent Ware-house and Dock dues 1½ per cent other incidental expences 1½ per cent ... ... } 5½ per cent	0	3	3			
Interest on Purchase.	£	*s.*	*d.*	£	*s*	*d.*
Six months @ 5 per cent	0	2	4			
Freight @ £ 3 per ton,	0	3	0	0	20	7
				0	68	4
Sale price per Mr. Bolitho,				0	56	0
Leaves a loss of per cwt.				0	12	4

Another calculation of November 1844.

	R.	*A.*	*P.*	
Usual cost of tin in Maulmain, Rs. 77-8 per 365 lbs., or Rs...	23	5	2	per cwt.
Freight to England @ £ 1.10 per ton, ...	0	12	0	
Duty at 10*s.*	5	0	0	
Shipping charges here and in London, ...	0	8	0	
Commission in London @ £ 2½ per cent.	0	13	0	
	30	6	2	

	£.	*s.*	*d.*
Or, ...	0	60	9
Assumed price in London, ...	0	56	0
Leaves a loss per cwt. of.	0	4	9

"The assumed rate for the ore at Maulmain, 45 rupees per 365 lbs, would be, I think, subject to a reduction ; but that for the metal, is probably the lowest average. It will be observed also, that the London price of 56*s* per cwt. is taken at a period of great depression in the value of the article which had averaged 72*s.* per cwt. ; but it would nevertheless appear, that to send it to England in the state of clean ore would be by far the safest investment" The richest tin locality in the Province of Tavoy is at the base of the eastern mountains, where the vallies are covered with a thick bed of diluvial pebbles and boulders, eight or ten feet thick, below which no tin is found —*Mason.*

The Malay and Javanese term for tin "*timah,*" is a word used in the Archipelago, as a generic term for both tin and lead, the epithet "white," or "flowery,"—"putih" and "*sari,*" being given to tin itself, and that of "blank," "*itam,*" to lead, a metal with which, being entirely a foreign product, the Malayan nations are but little acquainted. What may be called the Malayan tin district, or tin field, is, beyond all comparison, the most extensive and the richest in the world, for it stretches from Tavoy, in the 14° of north latitude, to Billiton, in the 3° of south latitude, that is, over seventeen degrees of latitude, and ten of longitude. Tin has been found or worked in a great many localities within these wide bounds, as in the British territory of the Tenasserim coast,—in the Siamese island of Junk-Ceylon,—in various parts of the continental territories of the Malayan states, and in several of the islands at the eastern end of the Straits of Malacca. The ore would seem only to become the more abundant as it approaches its termination at Banca and Billiton. The localities richest in tin are ascertained to be those near the junction of the sandstone with the granite, and all the countries rich in tin are also observed to be so in iron. All the ore heretofore worked, it should be noticed, has been found in the alluvium, or detritus of ancient mountains,—what is called in mining language "stream-works,"—obtained, in fact, by washing the soil in the same manner as, for the most part, gold in Australia and California ; for no ore has ever been obtained by mining the rock containing veins of it, although it has been traced to them. It must also be remembered that the greater part of the tin district is covered with an immense forest, and has not been explored, so that tin may reasonably be expected to be found in many situations which have hitherto remained unexamined. The supply of tin from the Malayan countries promises to last for at least as many ages as that of the coal of England. It is produced, in fact, in quantity proportionate to the labour and capital invested in working it, and without restriction from any other cause. With partial exceptions, the Chinese are at present the effectual miners and smelters, and the increase which has taken place in the quantity produced is remarkable. In the beginning of the present century the quantity yielded by Banca did not exceed 560 tons, and at present, increasing yearly, it is not less than 5540 tons. Yet the mines of Banca have now been worked for near a century and a half, being stated to have been first discovered only in the first years of the eighteenth century. The tin mines of Malacca were not worked at all, until as late as 1793, and not effectually by Chinese until 1840, but in 1848 they yielded, paying a seignorage of a tenth to the state, better than 250 tons. The production in the neighbouring Malay states had also greatly increased, so that the whole quantity exported from Malacca amounted in that year to above 960 tons. Mr. Logan estimates the whole quantity produced in the Malay Peninsula at about 2350 tons, exclusive of the produce of the Siamese territory; and when this is added to the produce of Banca, namely, 5540 tons, we have an aggregate annual yield of 7890 tons, or, making but a moderate allowance for the produce of the Siamese mines, of which we have no estimate, probably not less than double the amount of the tin of Cornwall. Probably, not less than five sixths of this amount have been brought into existence in the course of the present century. The price has not fallen with this new supply to the market, and as in the case of the gold of California and Australia, it may be asked how this has happened, and the answer must be the same, that new sources of consumption have been found, increased wealth and population keeping the demand equal to the supply.—*Crawfurd Dict. p.* 435. The *Tin* found in the island of Banca is very abundant and of a pure quality. It is cast into ingots weighing from 20 to 60 lbs; the purity of these bars is superior to those from the mines in Malacca. All that is of a superior quality which is brought to China in bars, is called 'Banca tin,' while the inferior is known as 'Straits tin.' Complaints have been made that both are adulterated with lead. The former sells for about 17 £ and the latter for 14 or 15 £ a pecul; the consumption of foreign tin has decreased during the last few years, and the annual importation does not now reach 5000 peculs. Tin plates are brought from England and America in boxes, containing 112 lbs. or from 80 to 120 plates, and sell for about 10 £ per box.—*Morrison.*

(8219) TINFOIL,

Beggud. Guz. Hind.

Is tin rolled into thin sheets, and employe with the addition of mercury, to cover the surface of glass, thus forming looking glasses, mirrors, &c.—*Joyce's Chem. Min.*

(8220) TIRYAQ FAROOQ.

Tiriyaq Farooq, also Tiriya pharka, Arab.
Treeyaq or Tiriyaq. Hind.

Dr. Irvine states that, as met with in Ajmere this is a black extract (most likely extract of henbane) of a narcotic odour: imported via Bombay carefully packed in a small tin box: a powerfu stimulant and is given in a sort of convulsive disorder called "seet," (catalepsy): one tola costs six or eight Rupees.—*Genl. Med. Top. p.* 152. I is, however, the celebrated Theriaca Andromachi of which the *Teucrium chamadrys*, the commo Germander forms an ingredient. The words however are merely the Arabic for the best sorts o treacle, and this substance being esteemed in Baghdad as an antidote for snake bites, *Tiryaq* has come to be applied as a general term for antidote. The substance is in much request in Beri-beri.

(8221) TOBACCO. Nicotiana.

Bujjerbhang, Tutun, Arab.
Tambroca, Bali.
Sang-yen, Chin.
Doon-kola, Cyng.
Tumakoo, Soon-putta, Cash.
Tobak, Dan.
Tabak, Dut.
Tabak, Fr.
Taback, Gr.
Tumbakoo, Guz. Hind.
Tabacco, It.
Tabaco, Jap
Tambroca, Jav.
Tabacum, Lat.
Tambracco, Mal.
Quauryete, Mex.
Tumbakoo, Pers.
Tobaka, Pol.
Tabaco, Port.
Tabak, Rus.
Dhumrapatra, Sans.
Tabaco, Sp.
Tutun, Dokhan, Turk.
Pogheieley, Tam.
Poghako, Tel.

Tobacco was introduced to Europe from the New World about the middle of the 16th century, and is now extensively cultivated in most parts of the world.

Tobacco, as it occurs in commerce, is of a yellowish-brown colour, soft and pliable, a little clammy, with something of a honey, mixed with a narcotic, odour; the latter, however, is not obvious in the fresh leaves. The taste is bitter, acrid, and nauseous. Virginian Tobacco, though the strongest, is best adapted for medical use, in order to observe uniformity of strength. Its active properties are taken up by water, Spirit, and Wine, but are destroyed by heat. Tobacco was elaborately analysed by Vauquelin. Most of the Tobacco of commerce, as that of Virginia, is yielded by N. Tabacum, as is that of India. Small Havannah cigars are said to be formed of the leaves of *N. repanda;* the Syrian and Turkish Tobaccos by *N. rustica* and the fine Shiraz Tobacco by *N. persica*, Lind.

In N. tabacum the Root fibrous. Stem erect, branched, and viscid, from 2 to 6 feet high. Leaves sessile, oblong, lanceolate, the lower ones decurrent, very large, a little hairy, viscid. Flowers in terminal panicles. Bracts linear-acute. Calyx tubular, swelling. 5-cleft, hairy, glutinous. Corol rose-coloured, funnel-shaped, throat inflated, ventricose, limb spreading, plicate, with 5-cleft acuminate segments. Stamens 5, declinate. Ovary ovate. Style long. Stigma emarginate. Capsule usually 2-celled, 2-valved opening crosswise at top, valves finally bifid. Seeds numerous, small, kidney-shaped, attached to fleshy placentæ.—Warm parts of America, but now cultivated in most parts of the world.—Nees von E. 194. St. and Ch. 37.—*Royle.*

We refer however to the articles "Nicotiana" for lengthened observations on the several species of this genus, and merely name here those considered as the sources af the Tobacco of Commerce. According to Loudon ("Encyc. of Plants"), there are fourteen species of this genus, besides varieties.

a. *N.* *tabacum* a native of several parts of America, but principally known as Virginian tobacco, having a stem rising from four to six feet, or more in height, bearing pink flowers. Of this there are three chief varieties known in America by the popular names of Orinoco, Broad-leaved and Narrow-leaved. Lindley enumerates eight varieties of N. tabacum.

b. N. macrophylla or large leaved tobacco, an ornamental annual, also with pink flowers, native of America, which rises to the height of six feet.

c. N. fruticosa, or shrubby tobacco, an ornamental evergreen shrub, native of China, with pink blossoms, which grows to about three feet.

d. N. undulata, or *suaveolens*, sweet-scented or New Holland tobacco, a green house perennial, native of New South Wales, with white flowers, which is only two feet high.

e. N. rustica.—The common green or English tobacco, an annual plant, native of America, producing white flowers, which seldom grows higher than three feet.

f. N. paniculata, or panicled tobacco, an annual plant bearing greenish yellow flowers, native of Peru, rises to the height of three feet.

g. N. glutinosa or clammy-leaved tobacco, also an annual plant, native of Peru, growing to the height of four feet, with bright scarlet flowers.

h. N. plumbaginifolia, or curled-leaved tobacco, an ornamental deciduous annual, native of America, with white blossoms, rising to the height of two feet.

i. N. pusilla, or primrose-leaved tobacco, an ornamental deciduous biennial, with white flowers, native of Vera Cruz, rising to three feet.

j. N. quadrivalvis, four-valved, or Missouri tobacco, an ornamental annual, native of North America, with white flowers, seldom growing higher than two feet.

k. N. nana, or Rocky Mount tobacco, a curious greenhouse annual, native of North America, with white blossoms, rising only three inches high.

l, N. Langsdorffii, or Langsdorff's tobacco, an ornamental annual, with greenish yellow flowers, native of Chili, reaching five feet high.

m. N. Cerinthoides, or honey wort tobacco, an ornamental annual, with greenish yellow flowers, native country unknown.

n. N. repanda, Havanna tobacco, an annual with white flowers, native of Cuba. rising two feet high.

There are a few species, native of the Province of Buenos Ayres, which may be particularised *N. banariensis*, having white flowers, *N. glauca*, yellowish green flowers; *N. longiflora*, white flowers, and *N. viscosa*, pink flowers.

The important mineral substances present in Havanna tobacco, examined by Hertung, are in 100 parts of ashes,

Salts of potash, ...	34·15
Salts of lime, ...	51·38
Magnesia, ...	4·09
Phosphates, ...	9·04

These substances were for the most part insoluble in earth, and must have been dissolved during the growth of the crop.

ANALYSIS OF FIVE SAMPLES OF TOBACCO.

	No. 1.	No. 2.	No. 3.	No 4.	No 5.
	Grown on argillaceous soil.		Grown on calcareous soil.		
Potash, ...	29·08	30·67	9 68	9·36	10·37
Soda, ...	2·26	—	—	—	·36
Lime, ...	27·87	24·79	49·28	49·44	39 53
Magnesia, ...	7·22	8 57	14·58	15·59	15 04
Chloride of sodium, ...	·91	5·95	4 61	3 20	6·39
Chloride of potassium,	......	...	4 44	3 27	2·99
Phosphate of iron, ...	8·78	6·03	5 19	6 72	7·56
Sulphate of lime,... ...	6 43	5·60	6 68	6·14	9·42
Silica, ...	17·65	18 39	5 54	6·28	8 34
	100·	100·	100·	100·	100·

There is no doubt that the manure which contains the largest proportion of alkaline carbonate, magnesia, lime snd gypsum, is that best adapted for tobacco. I give an analysis taken from Prof. Johnston's "Lectures," (2nd edition) of the ash of the tobacco leaf and the composition of a special manure for tobacco:—

Potash....	12 14
Soda	0 07
Lime	45.90
Magnesia.	13.09
Chloride of Sodium ...	3.49
Chloride of potassium...	3.98
Phosphate of iron ...	5.48
Phosphate of lime. ...	1.49
Sulphate of lime... ...	6 35
Silica	8.01
	100.00

All the ingredients which are necessary to replace 100 lbs. of the ash of tobacco leaves are present in the following Mixture :—

Bone dust, sulphuric acid	23lbs
Carbonate of potash(dry)	31 „
Carbonate of soda(dry)	5 „
Carbonate of Magnesia	25 „
Carbonate of lime(chalk)	60 „
	144 lbs.

The following is the result of an analysis of the fresh leaves of tobacco, by Posselt and Reimann ("Mag. Pharm." xxiv. xxv) :—

Nicotine.	0·06
Nicotianine, ...	0·01
Extractive matter, slightly bitter, ...	2·37
Gum, with a little malate of lime, ...	1·14
Green resin, ...	0·26
Vegetable albumen, ...	0·26
Substance analogous to gluten, ...	1·04
Malic acid, ...	0·51
Malate of ammonia, ...	0·12
Sulphate of potash, ...	0·04
Chloride of potassium, ...	0·06
Potash combined with malic and nitric acids,	0·90

Phosphate of lime, ...	0·16
Lime in union with malic acid, ...	0·24
Silica,...	0·08
Woody fibre,...	4·96
Water (traces of starch),...	87·21
	100 1

Dr. Covell, in "Silliman's American Journal," vol, vii., shows its components to have been but imperfectly represented in the above German analysis. He found in tobacco by chemical examination—1, gum; 2, a viscid slime, equally soluble in water and alcohol, and precipitable from both by subacetate of lead; 3, tannin; 4, gallic acid; 5, chlorophyle (leaf green); 6, a green pulverulent matter, which dissolves in boiling water, but falls down again when the water cools; 7, a yellow oil, possessing the smell, taste and poisonous qualities of tobacco; 8, a large quantity of a pale yellow resin; 9, nicotine; 10, white substance, analogous to morphia, soluble in hot, but hardly in cold alcohol; 11, a beautiful orange red dye stuff, soluble only in acids; it deflagrates in the fire, and seems to possess neutral properties; 12, nicotianine. According to Buchner, the seeds of tobacco yield a pale yellow extract to alcohol, which contains a compound of nicotine and sugar. M. M. Henery and Boutron Charlard found in 100 parts of

Cuba tobacco............	8·64	of nicotine.
Maryland..................	5·28	
Virginia....................	10·00	
Ile et Vilaine............	11·20	
Lot et Garonne	8·20	

quantities from 12 to 19 times more than were obtained by Posselt and Reimann.—("*Ure's Dictionary of Arts and Manufactures.*") The army of smokers in Great Britain and Ireland consume yearly about six millions of pounds worth of tobacco. The duty alone paid upon snuff and tobacco for the people of Great Britain, averages four-and-a-half millions sterling a year! The quantity consumed—smoked, snuffed, or chewed—during the same period, is about 28 millions of pounds weight, or about four pounds weight per annum for every male adult. Ireland annually pays not less than £800,000 of duty on tobacco and snuff, and only about £30,000 on coffee. For every pound of coffee that the Irish people use, they smoke away about *four pounds of tobacco.* North America produces annually upwards of 200 million pounds. The combustion of the mass of vegetable material used in this kingdom would yield about 340 million pounds of carbonic acid gas; so that the yearly produce of carbonic acid gas from tobacco smoking alone cannot be less than 1,000,000,000 lbs.—a large contribution to the annual demand for this gas made upon the atmosphere for the vegetation of the world. Henceforth let no one twit the smoker with idleness and unimportance. Every pipe is an agricultural furnace,—every smoker a manufacturer of vegetation,—the consumer of a weed that he may rear more largely his own provisions. In the year 1842, 605,000,000 of cigars were made in the German Commercial Union. In 1839, the revenue on tobacco in Great Britain was about £3,600,000. Of this it has been estimated eleven-twelfths are drawn from the working classes, and one-twelfth from the richer classes. The following is a calculation of the consumption of tobacco per head of the population, estimated from the number of pounds on which duty was paid:—

	Rate of duty.	Consumption per head. oz.
1801	1s. 7 3-10d. England. 1s. 0 7-10d. Ireland.	 17
1811	2s. 2 13-20d.	.. .. 19¼
1821	4s. 0d.	... . 11 45
1831	3s. 0d.	.... 12 35
1841	3s 1 8-10d.	.... 12 45
1851	3s. 1 4 5d.	 21

Thus it will be seen the consumption is materially affected by the rate of duty.

The imports into England of all kinds of tobacco for the five years 1848 to 1852, have been as follows:—

	1848.	1849.	1850.	1851.	1852.
	lbs.	lbs.	lbs.	lbs.	lbs.
Unmanufactured.........	34,090,360	41,546,848	35,166,358	31,061,953	33,205,635
Manufacture and snuff....	1,512,714	1,905,306	1,557,518	2,331,886	2,930,299
	35,603,074	43,452,154	36,723,876	33,393,839	36,135,934
Gross duty received:—	1848.	1849.	1850.	1851.	1852.
	£	£	£	£	£
On raw tobacco.........	4,267,579	4,328,217	4,337,258	4,386,910	4,466,533
Cigars, snuff, &c........	97,655	96,814	92,873	98,858	94,298
	4,365,234	4,425,031	4,430,131	4,485,768	4,569,831

The following quantities of unmanufactured tobacco, manufactured called negro-head, and cigars, were imported into the United Kingdom in 1850:—

Countries from whence imported.	Unmanufactured	Manufactured.
United States of America. . .	30,173,444	1,191,001
Venezuela, New Grenada and Ecuador	895,623	527
Brazil	12,138	56,802
Peru	8,649	6
Cuba	589 627	153,819
British West Indies, including Demerara and Honduras . . .	26,169	3,242
British Territories in the East Indies.	14,500	25,332
Philippine Islands	12,233	51,210
Hongkong and China . . .	2,706	2,340
Turkey, Syria, and Egypt . . .	140,361	2,882
Malta	13,028	7,818
Italy, Sardinian Territories . .	431,939	17
Gibraltar	7	3,063
Spain	307,641	1,100
France	29,950	1,521
Channel Islands	149	1,342
Belgium	29 922	6,579
Holland	2,418,732	9,078
Hanseatic Towns	50,310	36 880
Other parts	8,930	1,980
Total unmanufactured . . .	35,166,358	1,556,321
Ditto manufactured	1,556 321	
Snuff . . .	1,197	
Total . . .	36,723,876	

Culture in Connecticut.—Seed bed made rich and sown as cabbage as early in April as possible. Land well ploughed and manured and harrowed as for corn, laid out in rows three feet apart, and slight hills in the row about two and a-half feet apart; begin to plant about 10th of June, the ground to be kept clean with hoe and cultivator, and examine the plants and keep clear of worms. When in blossom and before seed is formed, the plants must be topped about thirty-two inches from the ground, having from sixteen to twenty leaves on each stalk, after this the suckers are broken off, and the plants kept clean till cut. When ripe the leaves are spotted, thick, and will crack when pressed between the fingers and thumb. It is cut at any time of the day, after the dew is off, left in the row till wilted, then turned, and if there is a hot sun, it is often turned to prevent burning; after wilting it is put into small heaps of six or eight plants, then carried to the tobacco house for hanging, usually on poles twelve feet long; hung with twine about forty plants to a pole, twenty on each side, crossing the pole with a hitch knot to the stump end of the plants; when perfectly cured, which is known by the stems of the leaves being completely dry, it is then taken in a damp time, when the leaves will not crumble, from the poles, and placed in large piles, by letting the tops of the plants lap each other, leaving the butts out; it remains in these heaps from three to ten days before it is stripped, depending on the state of weather, but it must not be allowed to heat. When stripped it is made into small hands, the small and broken leaves to be kept by themselves; it is then packed in boxes of about 400 lbs. and marked "Seed, Leaf Tobacco." One acre of tobacco will require as much labor as two of corn that produce 60 bags to the acre, and requires about the same quantity of manure If the tobacco can be cured without fire heat the quality will be improved, and if dried in the open air, should have shades of boards to keep off rain and excess of sun. The chief market for Connecticut tobacco is Bremen. In a number of the "Charleston Southern Planter." a remedy is described for preventing the destruction of plants by the fly. The writer says: "I had a bushel or two of dry ashes put into a large tub, and added train oil enough (say one gallon of oil to the bushel of ashes) to damp and flavor the ashes completely: this was well stirred and mixed with the hand, and sown broadcast over certain patches, and proved thoroughly effectual for several years, while parts left without the remedy were destroyed." The best ground for raising the plant, according to Capt. Carver ("Treatise on Culture of Tobacco," &c.), is a warm rich soil, not subject to be overrun with weeds. The soil in which it grows in Virginia is inclining to sandy, consequently warm and light; the nearer, therefore, the nature of the land approaches to that, the greater probabability there is of its flourishing. The situation most preferable for a plantation is the southern declivity of a hill, or a spot sheltered from the blighting north winds. But at the same time the plants must enjoy a free current of air; for if that be obstructed they will not prosper. The different sorts of seed not being distinguishable from each other, nor the goodness to be ascertained by its appearance, great caution should be used in obtaining the seed through some responsible mercantile house, or individual of character. Each capsule contains about a thousand seeds, and the whole produce of a single plant has been estimated at 350,000. The seeds are usually ripe in the month of September, and when perfectly dry may be rubbed out and preserved in bags till the following season.

Culture of Tobacco in the East.—We will now notice the method pursued in cultivating and curing the celebrated Shiraz tobacco of Persia (*Nicotiana Persica*), which is so much esteemed for the delicacy of its flavor, and its aromatic quality. It is thus described by an intelligent traveller. The culture of the plant, is nearly the same; it is only the preparation of the tobacco that forms the difference:—

In December the seed is sown in a dark soil, which has been slightly manured (red clayey soils will not do). To protect the seed and to keep it warm, the ground is coverd with light, thorny bushes, which are removed when the plants are three or four inches high; and during this period the plants are watered every four or five days only however in the event of sufficient rain to keep the soil well moistened not falling. The ground must be kept until the plants are six to eight inches high, when they are transplanted into a well moistened soil, which has been made into trenches for them ; the plants being put on the top of the ridges ten or twelve inches apart, while the trenched plots are made, so as to retain the water given. The day they are transplanted, water must be given to them, and also every five or six days subsequently, unless rain enough falls to render this unnecessary When the plants have become from thirty to forty inches high, the leaves will be from three to fifteen inches long. At this period, or when the flowers are forming, all the flower capsules are pinched or twisted off. After this operation and watering being continued, the leaves increase in size and thickness until the month of August or September, when each plant is cut off close to the root, and again stuck firmly into the ground. At this season of the year, heavy dews fall during the night ; when exposed to these the color of the leaves change from green to the desired yellow. During this stage, of course no water is given to the soil. When the leaves are sufficiently yellow, the plants are taken from the earth early in the morning, and while they are yet wet from the dew, are heaped on each other in a high shed, the walls of which are made with light thorny bushes, where they are freely exposed to the wind. While there, and generally in four or five days, those leaves which are still green become of the desired pale yellow color. The stalks and centre stem of each leaf are now removed, and thrown away, the leaves are heaped together in the drying house for three or four days more, when they are in a fit state for packing. For this operation the leaves are carefully spread on each other and formed into cakes of sorts, the circumference from four to five feet, and three to four inches thick, great care being taken not to break or injure the leaves. Bags made of strong cloth, but thin and very open at the sides, are filled with these cakes, and pressed very strongly down on each other ; the leaves would be broken if this were not attended to. When the bags are filled, they are placed separately in a drying house, and turned daily. If the leaves were so dry that there would be a risk of their breaking during the operation of packing, a very slight sprinkling of water is given them to enable them to withstand it without injury. The leaf is valued for being thick, tough, and of a uniform light yellow colour, and of an agreeable aromatic smell.

In *India*, the Surat, Bilsah, and Sandoway (Arracan) varieties of tobacco are the most celebrated. The two first are found to be good for cultivation in the district about Calcutta, but the Cabool is still more to be preferred. Tobacco requires in the East, for its growth, a soil as fertile and as well manured as for the production of the poppy or opium. It is, therefore, often planted in the spaces enriched by animal and vegetable exuviæ, among the huts o the natives. I have tried seed in different soils' says Capt. C. Cowles,—namely a light garden mould with a large portion of old house rubbish dug to a good depth, which had a top dressing o the sweepings of the farm-yard and cow-houses a rather heavy loam, highly manured with burnt and decayed vegetables, and old cow dung ; the third was a patch of ground, which was originally an unwholesome swamp, from being eighteen inches to two feet, lower than the surrounding land ; the soil appeared to be a hard sterile clay and covered with long coarse grass and rushes As there was a tank near it, I cut away one side of it, and threw the soil over the ground bringing it rather above the level. Such was its appearance, (a hard compost marly clay,) that I expected, no other good from it than that of raising the land so as to throw the water off ; contrary, however, to my expectations, it produced a much finer crop of tobacco than either of the other soils, and with somewhat less manure. The agricultural process is limited to some practical laws founded on experience, and these are subject to two principal agents ; viz. the soil and climate. With respect to the former, it is the practice amongst the growers in tobacco countries, such as Cuba, the States of Virginia, North and South Carolina, and the Philippine Islands, to select a high and dry piece of land, of a siliceous nature, and combined with iron, if possible ; and with respect to the latter, there are seasons of the year too well known to the planters to need any explanation. The only difference (if there is any) depends on the geographical situation of the place, with respect to its temperature, or in the backwardness or advancement of seasons, and even on the duration of the same—in which circumstances the planter takes advantage of the one for the other.

The influence of a burning climate may be modified by choosing the coolest month of the year, whereas the soil cannot be altered without incurring great expense. I have seen tobacco lose its natural quality and degenerate by transplanting from one soil to another, although of the same temperature, and *vice versa*.

Mr. Piddington has analysed several Indian soils, distinguished for the production of superior tobacco. These are in the table soils from Arracan, (Sandoway,) a soil from Singour, in Burdwan, near Chandernagore, the tobacco of which, though of the same species as that of the surrounding country, sells at the price of the Arracan sorts ; and the soil of the best Bengal tobacco, which is grown at, and about Hingalee, in the Kishnagur district.

The best tobacco soils of Cuba and Manila, are for the most part red soils. Now, the red and reddish soils contain most of their iron in the state of peroxide, or the reddish brown oxide of on, while the lighter grey soils contain it only the state of protoxide, or the black oxide of on. Mr. Piddington believes the quality of the obacco to depend mainly on the state and quanty of the iron of the soil, while it is indifferent om the lime, which is so essential to cotton. one of the tobacco soils contain any lime. heir analysis show them to contain :—

	Arracan soil.	Singour soil.	Hingalee soil.
xide or iron, (peroxide) . .	15·65	10·60	6·00
Vater and saline matter	1·10	75	1 50
egetable matter and fibre	3·75	1·10	75
ilex	76·90	80·65	87·25
lumina	2·00	4·50	1·50
	99·40	97·60	97·00
Vater and loss	60	2·40	3·00
	100	100	100

rom which it will be seen that the best toacco soil hitherto found in India contains about xteen per cent., or nearly one sixth, of iron, hich is mostly in a state of peroxide; and that e inferior sort of tobacco grows in a soil conining only six per cent., or one-sixteenth of on, which is, moreover, mostly in the state f protoxide, or black oxide. Mr. Piddington ought it worth examining what the quantity f iron in the different sorts of tobacco would e, and found that while the ashes of one ounce, r 480 grains of Havana and Sandoway cheroots ave exactly 1·94 grains, or 0.40 per cent., of eroxide of iron, the ashes of the same quantity f the Hingalee, or best Bengal tobacco, only ave 1·50 grains, or 0 32 per cent. ; and it apears to exist in the first two in a state of eroxide, and in the last as a protoxide of on ; rendering it highly probable that the avor of the tobacco to the smoker depends on e state and quantity of the iron it contains ! reen copperas water, which is a solution of lphate of iron, is often used by the American nd English tobacconists and planters, to colour nd flavor their tobacco ; and this would be deomposed by the potass of the tobacco, and lphate of potass and carbonate of iron is rmed. Carbonate of iron is of an ochre-yellow olour. Mr Piddington says he took care to scertain that this process had not been perrmed with the tobacco used for this experiient ; and adds that Bengal cheroot makers do ot know of this method. Mr. Laidley, of onitea, dissents from the idea suggested by r. Piddington that ferruginous matter in the oil is essential to the successful growth of toacco. He observes that if we attend only to he iron contained, why every plant will be und to require a ferruginous soil ; but tobacco ontains a notable quantity of nitrate of potass nd muriate of ammonia (the latter a most are ingredient in plants), and these two alts are infinitely more likely to affect the avor of the leaf than a small portion of oxide of iron, an inert body. Now as neither of these can be supplied by the atmosphere, we must search for them in the soil, and accordingly he imagined that a compost similar to the saltpetre beds which Napoleon employed so extensively in France, would be a good manure for tobacco lands; namely, calcareous matter, such as old mortar, dung, and the ashes of weeds or wood. He was aware that good tobacco might be grown in Beerbhoom, having raised some himself several years ago from American seed. The plants grew most vigorously, and he further observed, in confirmation of his opinion about the proper manure, that in other districts in which he had resided the natives always grew the tobacco (each for his own use) upon the heap of rubbish at his door, consisting of ashes, cow-dung, and offal of all kinds. While the soils of the Gangetic diluvium almost always contains carbonate of lime, the Beerbhoom soil does not, as far at least as Mr. Laidley had examined it. The following is the mode of culture pursued about the city of Coimbatore. Between the middle of August and the same time in September, a plot of ground is hoed and embanked into small squares ; in these the seed is sown, and covered by hand three times at intervals of ten days. To secure a succession of seedlings water is then given, and the sun's rays moderated by a covering of bushes. Watering is repeated every day for a month, and then only every fifth day. The field in which the seedlings are transplanted, is manured and ploughed at the end of August. Cattle are also folded upon the ground. Four or five ploughings are given between mid September and the middle of October, when the field is divided as above into small squares. These are watered until the soil is rendered a mud. Plants of the first sowing are then inserted at the end of September, about a cubit apart, the transplanting being done in the afternoon. At intervals of ten days the seedlings of the other two sowings are removed. A month after being transplanted the field is hoed, and after another month the leading shoot of each plant is pinched off, so as to leave them not more than a cubit high. Three times during the next month all side shoots thrown out are removed. When four months old, the crop is ready for cutting. To render the leaves sweet the field is watered, and the plants cut down close to the surface, being allowed to remain when cut until next morning. Their roots are tied to a rope and suspended round the hedges. In fine weather the leaves are dry in ten days, but if cloudy they require five more days. They are then heaped up under a roof, which is covered with bushes and pressed with stones for five days. After this the leaves are removed from the stems, tied in bunches, heaped again, and pressed for four days longer. They are now tied in bundles partly of the small leaf and partly of the large leaf bundles, and again put in heaps for ten days—once during the time the heaps being opened and piled afresh. This completes the drying. A thousand bundles, weighing about 570 lbs., is a good produce for an acre.

Ceylon.—In 1760, Ceylon produced a considerable quantity of tobacco, principally about Jaffna, a demand having sprung up for it in Travancore, and on the Malay coast. The cultivation spread to other districts of the island, Negombo, Chilaw, and Matura. Not long after the possession of the island by the British, a monopoly was created by an import duty of 25 per cent, *ad valorem*, and in 1811 the growers were compelled to deliver their tobacco into the Government stores at certain fixed rates. The culture and demand thereupon decreased. In 1843, the duty on the exports of tobacco from this island amounted to £8,386, and in 1836 to £9,514. Ceylon now exports a considerable quantity of tobacco. The value of that exported in 1844 was nearly £18,000: it went exclusively to British colonies. The shipments since have been as follows :—

1848	...	..	£17,992	...	...	———
1849	...	...	22,300	...	...	———
1850	...	...	20,721	...	...	22,184 cwts.
1851	...	...	21,422	...	...	22,523 ,,
1852	...	...	20,531	...	...	21.955 ,,

Archipelago, Siam, Philippines, Manilla.—About 96,000 piculs of cigars, of five different qualities, are exported annually from Siam. A good deal of very fine tobacco is grown in the Philippines, and the Manila cheroots are celebrated all over the globe. The quantity of raw tobacco shipped from Manila in 1847 was 92,106 arrobas (each about a quarter of a cwt) ; manufactured tobacco, 12,054 arrobas ; and 1,933 cases of cigars. 5,220 boxes of cigars were shipped from Manila in 1844. 73,439 millions of cigars were shipped in 1850, and 42,629 quintals of leaf tobacco. The manufacture of cigars in Manila is a monopoly of the government, and not only is this the case, but it is a monopoly of the closest description, and any infringement of the assumed rights of the Spanish Indian government is visited by the most severe penalties. Public enterprise, however little of that commodity there now exists in the Spanish character, is thus kept down ; and this is not only detrimental to the nation itself, but is also unjust towards those persons who are the purchasers of the article, enhanced in price, as is always the case, by monopoly. The cheroot, which now costs, free of duty, about one halfpenny, could be rendered for half that sum, according to well-authenticated opinions. To protect itself from illicit manufacturers, or smuggling of any kind in connection with cigars, the government is compelled to maintain an army of gendarmes, in order to adopt the most stringent means which despotic states alone tolerate. No person is, therefore, permitted to have even the tobacc leaf in its raw state on his premises, and gen armes pay, at stated intervals, domiciliary visi to the habitations of the people, in searc of any contraband materials. There are severa extensive manufactories of cigars and cheroot belonging to the government in and near Manil Mr. MacMicking, in his recent work on the Ph lippines, thus describes the mode of manufactur by those employed by the government :—In making cheroots women only are employe the number of those so engaged in the factory a Manila being generally about 4,000. Besid these, a large body of men are employed a another place in the composition of cigarillos or small cigars, kept together by an envelope o white paper in place of tobacco ; these bein the description most smoked by the Indians The flavor of Manila cheroots is peculiar to themselves, being quite different from that made o of any other sort of tobacco ; the greatest characteristic probably being its slightly soporific tendency, which has caused many persons in th habit of using it to imagine that opium is employed in the preparatory treatment of the tobacco, which, however, is not the case. Th cigars are made up by the hands of women i large rooms of the factory, each of them containing from 800 to 1,000 souls. These are al seated, or squatted, Indian like, on their haunches, upon the floor, round tables, at each o which there is an old woman presiding to kee the young ones in order, about a dozen of them being the complement of a table. All of them are supplied with a certain weight of tobacco, of the first, second, or third qualities used in composing a cigar, and are obliged to account for a proportionate number of cheroots, the weight and size o which are by these means kept equal. As they use stones for beating out the leaf on the wooden tables before which they are seated, the noise produced by them while making them up is deafening, and generally sufficient to make one not desirous of protracting a visit to the place. The workers are well recompensed by the government, as very many of them earn from six to ten dollars a month for their labor ; and as that amount is amply sufficient to provide them with all their comforts, and to leave a large balance for their expenses in dress, &c., they are seldom very constant laborers, and never enter the factory on Sundays, or, at least, on as great an annual number of feast days as there are Sundays in a year.

The *Japanese* grow a good deal of tobacco for their own consumption, which is very considerable. They consider that from Sasma as the best, then that from Naugasakay, Sinday, &c. The worst comes from the province of Tzyngaru ; it is strong, of a black colour, and has a disgusting taste and smell. The tobacco from Sasma is, indeed, also strong, but it has an agreeable taste

nd smell, and is of a bright yellow color. The
bacco from Nangasakay is very weak, in taste
nd smell perhaps the best, and of a bright
rown color. The tobacco from Sinday is very
ood. The Japanese manufacture the tobacco
well, says Capt. Golownin, (Recollections of
apan,) that though I was before no friend
smoking, and even when I was at Jamaica
uld but seldom persuade myself to smoke an
lavana cigar, yet I smoked the Japanese to-
acco very frequently, and with great pleasure.

Java.—The culture of tobacco is a very profi-
ble article for the laborers, seeing that the pro-
ice is obtained from grounds which have
ready given the first crop. The qualities of
iva tobacco are more and more prized in
e European markets, the preparation and
sortment are not yet all that could be de-
red, but they have progressed in this branch,
d the contracts made with the new adven-
rers assure them of a considerable benefit. But
fore the Java tobacco can find an assured
ening in the European markets, it is necessary
at the cultivators should make use of seed
om the Havana Manila. The residencies of
embang, Sourabaya, Samarang, Chinbou, and
agal, present districts suited for its culture;
has been carried on with success for a good
any years in the residencies of Treanger, Paka-
ngan, and Kedu, but only for the consumption
the interior, and of the Archipelago.

Celebes.—Tobacco is cultivated in Celebes,
it merely in sufficient quantity for local con-
mption. It is exclusively grown by the
antik population—the mode of preparation
the same as in Java; it is chopped very
e and mostly flavored with arrack. When
ught in large quantities, it may he had for
irty cents the pound; but in smaller quanti-
s it costs double that price.

Australia.—Tobacco is cultivated in New
uth Wales with much success. Australia
oduces a leaf equal to Virginia, or the
ost fertile parts of Kentucky, but the great
fficulty is to extract the superabundant "nitre."
e first crop in New South Wales exceeds
e ton per acre, and the second crop of the
me plants, yields about half the weight of the
st. In 1844 there were about 871 acres in
ltivation in New South Wales with tobacco,
d the produce was returned at 6,382 cwts.
New England, New South Wales, as fine
"fig" as could be wished for is manufactured
der the superintendence of a through-bred
rginia tobacco manufacturer—but the impos-
ility of extracting the nitre by the heating,
any other process, renders the flavor rank
d disagreeable. Perhaps cheroots,, or the
wer numbers of cigars, manufactured from the
ustralian leaf, might prove more successful.—
mmonds, p. 590 *to* 621.

Culture of Tabacco in India.—The tobacco of Chunar, on the Ganges, and more especially that of Bhilsa, near Nagpore, are celebrated throughout India, while Dr. Ainslie states, that "the finest kinds in India, and perhaps in the world, are grown near the village of Woodanum, in the Northern Circars, and in some of those low sandy islands formed at the mouths of the river Krishna, (from this is made the famous Masulipatam snuff,) also in the Delta of the Godavery, where the soil is peculiarly rich and fertile," the product being known as Lunka tobacco. Mr. Ritchie, in his Evidence before the Committee of the House of Commons, in 1831, stated, that Tobacco of very fine quality is produced extensively in Guzerat, and the northern districts of the Bombay Presidency. One bale imported, sold higher than any American, as it brought 6*d.* when the latter was sold for 5*d.* a pound; but the average of an experimental exportation was found to be defective in the curing, and did not pay, Excellent Tobacco is grown at Sandaway, in Arracan, and when this was brought to London it was valued at from 6*d.* to 8*d.* a pound. Mr. Piddington mentions the Tobacco of Singonr, in Burdwan, near Chandernagur, as selling at the price of the Arracan sort, though of the same species as that cultivated in the surrounding country; and that the best Bengal tobacco is grown at and about Hanglee, in the Kisnagar district. The kinds of Tobacco cultivated, vary according to situation and the mode of culture. Some distinct species are also cultivated in different countries, but Nicotiana tabacum and its varieties are so, most extensively. N. rustica is chiefly cultivated in western Africa and Egypt, also near Salonica and Latakia, and likewise in some parts of Europe. Dr. Lindley considers the Persian Tobacco to be a distinct species, which he has named N. persica. The seed of these several species is well worthy of trial in different parts of India, as well as seed from those places which are already celebrated for their tobacco, as Dr. Royle has already recommended in his article on this subject.

Arracan Tobacco.—One of the results of Dr. Wallich's investigations was the bringing to notice some very superior Tobacco, which obtained the name of Martaban Tobacco. Dr. Wallich states, that 'the sort is from Arracan and not from Martaban;' and describes it as having 'a fine silky leaf: tried by many people, it had been pronounced the very best they had ever tasted, equal to, nay surpassing, the finest imported from Turkey and Persia.' An extensive Tobacconist says, 'a finer and better-flavoured Tobacco he never saw or tasted in his life.' One of the first brokers in the City says, 'the sample of leaf Tobacco is certainly of a very fine quality, and appears to have been produced from some peculiar seed and a greatly-improved cultivation and cure.' By many manufacturers 'it was supposed to be from the seed of Havannah or St. Domingo Tobacco.' For smoking, it is compared with Maryland Tobacco, having the same qualities, 'except the flavour, which is better, and more like Havannah.' The colour and leaf are moreover, pronounced excellent for cigar-making; 'but if anything is against it for that purpose, it is the largeness of the principal stalk, and coarseness of the small fibres in the leaf.'—*Royle's Productive Resources of India.*

Godavery.—For Lunka segars, the *Nicotiana rustica* is grown on the islets of the Godavery, where the cultivation is rapidly increasing; these are a superior article.—*M. E. J. R.* The Tobacco of the Godavery lunkas, or islands of the Godavery, is rather famous. The tobacco generally produced in India is generally complained of as too high dried and fit only for inferior kinds of snuff. The tobacco most celebrated among cigar smokers in the Madras presidency appears to be the Trichinopoly, and the Lunka or that produced on the islands in the Godavery and Kristna: from the latter the Masulipatam snuff is manufactured. A high value was put on specimens of tobacco from American seed produced in Calcutta. There appears the certainty that India can produce as good tobacco as America with the same care in the selection of situation in cultivation, preparation, and packing. It is only necessary to refer to the improvements that have been introduced in the cultivation and production of silk, indigo, cotton, and to be able to appreciate the probable benefit of similar attempts in improving tobacco. The value of good tobacco in the District of Masulipatam is from 10 to 15 rupees a candy of 500 lbs or about ½*d* per lb. The best Lunka tobacco is from the Seetanagram island near Gootala in the Godavery and is sold usually at 40 rupees a candy on the spot. It has increased to this price within two years from 15 Rupees.—*Rohde M. S. S.*

Tenasserim Tobacco is more universally used in Burmah, than it perhaps ever was in its native country. The Karens raise it for their own consumption, and the Burmese both cultivate it, and import it from Rangoon.—*Mason.*

(8222) TOBAGO CANES. This walking stick is a product of a palm, the Bactris minor, *Jacq.*, a native of New Granada and the West Indies —*Seeman.*

(8223) TODACUTTIE WOOD.

Todacuttie marum. TAM.

This beautiful, hard, and compact wood, which is, in some parts of the country, called Nookoo marum, is occasionally employed for making escretoires, cabinets &c. &c.—*Ains. Mat. Med. p.* 207.

(8224) TODDALIA, a genus of Plants belonging to the natural order *Kutaceæ* tribe *Xanthoxyleæ*, which is itself sometimes made into an order. The name *Toddalia* is derived from Toddali, the Malabar name of one of the species. The genus is distinguished by having unisexua flowers, the calyx 5-toothed; petals 5; stamens 5, longer than the petals; stigma almos sessile, peltate; fruit fleshy, 5-furrowed, 5-celled, cells 1-seeded; seed kidney-shaped; embryo arched.—*Eng. Cyc.* An inferior cosmetic woo or cosmestic tubercles. is seen in the Tenasserim market, which is the tubercle of some plant, probably Toddalia aculeata or T. floribunda. Th Burmese appear, from their name, to regard then as produced by a species of erythrina, for the call them "erythrina thorns;" but Mr. Maso knows the plant to be a creeper, and suspect that it is of the above genus.

(8225) TODDALIA ACULEATA. *Syn.* Scopolia aculeata. Roxb. vol i. 616.

Kaka toddali. TAM. | Conda cashinda, TEL.

Toddalia aculeata has prickly stems and branches, and extends to 30° N. lat., along the jungl base of the Himalayan Mountains. The bar and root of this species are said to be used as cure for the remittent fever of such situation and as many of the allied plants are possessed of bitter with aromatic properties, i is probable that this plant also may be useful for such purposes—*Eng. Cyc.* This i one of the most common bushes on the coas of Coromandel, and Dr. Roxburgh mention that every part of this shrub has a stron pungent taste and that the roots when fres cut smell particularly so. The fresh leaves ar eaten raw for pains in the bowels; the rip berries are fully as pungent as black pepper and with nearly the same kind of pungency from these the natives prepare an excellen pickle. The fresh bark of the root is administered by the Telinga physicians for the cure o that sort of remittent commonly called the "hil fever." Roxburgh says, "I conceive every par of this plant to be possessed of strong stimu lating powers, and have no doubt, but tha under proper management it might prove valuable medicine where stimulants are required.' The bark of the Toddalia deserves most carefu trial, and will in all probability be found a ver valuable medicine.—*O'Shaughnessy, page* 265 A tincture of Toddalia aculeata, is a power ful stimulant and diaphoretic, also considere tonic and febrifuge. - Dose, one to three flui drachms. This bark is a native remedy o high repute in the treatment of the collaps from jungle fever.—*Beng. Phar. p.* 433. Th most recent notice of this drug is to be found at page 395 of Indian Annals of Medical science. *Toddalia aculeata* and *Toddalia floribunda.* An inferior cosmetic wood is seen in market, which is the tubercle of some plant. The Burmese appear, from their name, to regard them as produced by a species of erythrina, for they call them "erythrina thorns;" but Mr. Mason knows the plant to be a creeper, and suspects that it is of the above genus.

(8226) TODDY.

Toddy, Neera Saindee, Maree, Sur Duk.
Guz. Hind.
Sura. Tari, Tadi, Sans.
Khulloo, Tam.
Khulloo Tel.

Toddy is the general name given by Europeans to those sweet, delicious, refreshing liquors, which are procured in the tropics, by wounding the *spathe* &c. of certain palms, when the juice exudes and drops into earthen pots, which are attached to the stem to receive it. Taken fresh from the tree, early in the morning, before the sun is up, it forms a most pleasant and delicious drink. Its chief use, however, is for making the fermented intoxicating fluid, as also arrack, sugar, and vinegar.—*Faulkner.* Toddy, as above stated, is the sap and juices which exude from the trunks or from the fruit stalks of several kinds of palm trees, and is a product peculiar to tropical countries. In the West Indies, it is obtained from the trunk of the Attalea cohune, a native of the Isthmus of Panama. In Eastern Asia, the palms from which it is prepared are the Gomuti palm, the Cocoanut, the Palmyra, the Date and the Kittul or Caryota urens.

The Gomuti Palm, *Arenga Saccharifera*, is fit to yield toddy when nine or ten years old, and continues to yield for two years, at the average rate of three quarts a day. On the first appearance of the fruit, one of the spadices is beaten with a short stick, on three successive days, with the view of determining the sap to the wounded part. The spadix is cut off a little way from its root or base, and the liquor, which pours out, is received in pots of earthen ware, in bamboos, or other vessels. When newly drawn, the liquor is clear, and in taste resembling fresh must. In a very short time it becomes turbid, whitish, and somewhat acid, and quickly runs into the various states of fermentation acquiring an intoxicating quality. In Malacca, the Gomuti termed Kabong, comes in bearing after the seventh year. It produces two kinds of Mayams spadices,—male and female. The female spadix yields fruit, but no juice, and the male *vice versa.*

To procure the Toddy of the Palmyra tree, the Borassus flabelliformis, at the season when the inflorescence begins to appear, and before the spathes have had time to burst, the toddy drawer cuts off all leaves except three or four of the leaves, and all or most of the spathes are effectually encompassed from end to end, by thongs, to prevent the inflorescence from bursting forth. When thus tied for three successive mornings they are beaten or crushed between the wooden battens, with the object of keeping them from bursting and to encourage the flow of sap. On the fourth morning, a thin slice is cut from the parts of the spathes. On the eighth morning a clear sweet liquor begins to flow from the wounded parts, and the toddy drawer then ascends in the morning with chatties, or toddy receivers, in which he places the ends of the spathes, and leaves them until the morning, when they are found to contain a quantity of this liquor. The operation of attracting the juice is repeated every morning or evening until the whole spathe is sliced away. The trees are drained in this manner, for several months of the year, seven or eight spathes yielding at the same time.

The Toddy of the Cocoa-nut Tree (*Cocos nucifera*) is obtained from the flower spathes before the flowers have expanded in a manner almost similar to what has been described for the Palmyra palm.—The spathe is tied with strips of the young leaves, to prevent its expansion; it is cut a little transversely from the top, and beaten either with the handle of the toddy knife or a piece of hard wood, a process which is repeated morning and evening for five or six days, in succession, the under part of the spathe is taken off, to allow of its being bent, in which position it is retained by being attached to a leaf-stalk below. An earthen pot or leaf basket, is a few days afterwards attached to the end, and is every morning and evening emptied of the toddy which exudes into it, the quantity of which greatly varies. A little portion of the spathe is daily cut off.

Toddy is also procured from the "*Date Tree*" of India "*Phœnix dactylifera,*" during the months of November, December, January and February, during which period each tree is reckoned to yield from 120 to 240 pints of juice. But the mode of its extraction destroys both the fertility and the appearance of the tree. After removing the lower leaves and their sheaths, a notch is cut in the pith of the tree near the top, from which the toddy issues by a small channel, made of a bit of the Palmyra leaf, into a pot suspended to receive it.

Palm Wine is also extracted from the Caryota urens during the hot season. The quantities which are said to flow from it are immense, so much as a hundred pints during the twenty four hours.

The taste of Toddy in its fresh state, probably varies according to the state of the weather and season of the year, which will explain the many comparisons given of it, to Poubon water, mild champagne; cider, ginger beer, perry, &c. In all Eastern countries, the toddy of these several trees is used for the same purposes. It is drank, though rarely, when fresh from the tree, and is then a gentle aperient particularly useful in delicate constitutions. It is boiled down into a sugar called Jaggery or *Goor* which is afterwards refined. It is fermented in the course of a day, into a mildly intoxicating liquor, still known as toddy, of which several pints are partaken before intoxication comes on. It is also distilled into arrack, made into vinegar, and throughout all Eastern countries it is employed as yeast as it begins to ferment in a few hours after it is drawn. In the peninsula of India the ropes employed by the toddy drawers to help them to climb the tree, are made of cow or buffalo hide, but in other countries the pliant tendrils of plants are sometimes employed. The ropes are sufficiently large to surround the tree and the body of the climber, who by leaning backwards and throwing his whole weight on the rope, is thus enabled to retain the position he has taken up, while by drawing up his feet and shifting the thong in his hand to higher points, he gradually raises himself to the top of the tree. Accidents however are frequent and frightful.

(8227) TOLU BALSAM, SAINT THOMAS'S BALSAM.

Baume de Tolu. FR,	Balsamo de Tolu. SP.
Tolutanischer balsam GER.	

The concrete juice of the *Myroxylon toluiferum*, is of a brownish-yellow colour, transparent, with the taste and odour of the white balsam of Peru. It is obtained from America.—*Faulkner*.

(8228) TOMATOES. SOLANUM LYCOPERSICUM. A well known vegetable of easy culture, does not require a very rich soil, succeeds best when trained on horizontal trellises, should be thinned occasionally of superfluous shoots, raised from seed, used in sauces, &c.—*Jaffrey*. See LOVE APPLE SOLANUM.

(8229) TONGLO. Barometrical observations taken simultaneously with those of Calcutta, give the height of Tonglo in Southern Sikkim as 10,078·3 feet. Colonel Waugh's, by trigonometry, 10,070·4 feet—a remarkable and unusual coincidence.—*Hooker, Him. Jour. Vol. I. p.* 171.

(8230) TONKIN BEANS. Are oval, oblong, somewhat boat-shaped seeds, from one to two inches long, shining, with an oily surface marked with a network of wrinkles; colour, purple-brown, odour very fragrant; taste slightly bitter, but very burning and almost caustic. They are only employed as a perfume for snuff. The plant (*Dipterix odorata*), is a native of the woods of Guiana.—*Faulkner*.

(8231) TOOLSEE, *Hind*: is the name given in India, to the Ocymum villosum. Toolsee was a disciple of Vishnu. Desiring to be his wife, she excited the jealousy of Lukshmee, by whom she was transformed into the herb named after her. There are, however, several well known species of the genus Ocymum, to each of which different names are given, viz. the *Ram Toolsee*, is the Ocymum gratissimum; *Babooye Toolsee*, Ocymum pilosum; the *Krishna Toolsee*, Ocymum sanctum; but only the last and the common Toolsee, O. villosum, are held to be sacred to Vishnoo and used in his worship. See OCYMUM.

(8232) TOON-WOOD. CEDRELA TOONA, has already been mentioned under that head, also of Cedar, as being similar to the so-called Havannah cedar, the Cedrela odorata. The toon-tree is C. toona; its wood is of a reddish-brown colour, rather cross grained, but much used all over India for furniture and cabinet-work.—*Holtz* Lieut. Nuthall, as quoted by Captain Munro, mentions "*toon*" as one of the woods of Arracan, under the name of "thit-ka-do." We have, however, the authority of Wallich for saying that thit-ka-do is a species of sterculia, a genus that produces no valuable timber. Still, as it is possible that there may be only a mistake in the name while the thing itself exists, the remark is worth putting on record.—*Mason*

(8233) TOOTEE, is the long silky hemp like fibre of three species of Abutilon, the A. tomentosum. A. polyandrum and A. indicum.

(8234) TOPAZ.

Poosperagam, TAM.	Topase, FR,
Purperagan, CYNG.	Topas GER.
Pokhraj, HIND.	Topazio, IT.
Zuburjud, PERS.	Topas, RUS.
Topaz, ARAB.	Topacio, SP.

Topaz occurs massive, in imbedded and rounded crystals. Primary form a right rhombic prism. Cleavage easy, parallel to the base of the primary form, more difficult in the direction of its lateral faces. Structure lamellar at right angles to the axis of the prism. Fracture uneven, rightly conchoidal. Hardness; scratches quartz. Electricity; positive by friction; those crystals which possess different faces of crystallisation at opposite ends acquire different kinds of electricity at the two extremities when heated. Colour white, yellow, bluish, and greenish. Lustre vitreous transparent, translucent. Specific gravity 3.499. Fragments exposed to heat emit a blue, green, or yellowish phosphoric light. By the blowpipe on charcoal it does not fuse, but with borax it melts into a transparent glass. Topazes occur generally in primitive rocks, and in many parts of the world, as Cornwall, Scotland, Saxony, Siberia, Brazil, &c. The following analyses have been given of this mineral: (1) Saxon topaz by Klaproth; (2) Brazilian topaz by Klaproth; (3) Saxon topaz by Berzelius; (4) Brazilian topaz by Berzelius:—

	(1)	(2)	(3)	(4)
Silica..	25	44 5	34·24	34·01
Alumina...	56	47·5	57·45	58·38
Fluoric Acid ...	5	7 0	7·75	7·79
Oxide of Iron,...	—	0·5	—	—
	99	90·5	99·44	100·18

The ancient *Topazion* was found on an island in the Red Sea, which was often surrounded with fog, and therefore difficult to find. It was hence named from 'topazo,' to seek. This name, like most of the mineralogical terms of the ancients, was applied to several distinct species. Pliny describes a statue of Arsinoe, wife of Ptolemy Philadelphus, four cubits high, which was made of topazion, or topaz, but evidently not the topaz of the present day, nor chrysolite, which has been supposed to be the ancient topaz. It has been conjectured that it was a jasper or agate; others have imagined it to be prase, or chrysoprase. Topaz is employed in jewellery, and for this purpose its colour is often altered by heat. The variety from Brazil assumes a pink or red hue, so nearly resembling the Balas ruby, that it can only be distinguished by the facility with which it becomes electric by friction. The finest crystals for the lapidary are brought from Minas Novas, in Brazil. From their peculiar impidity, topaz-pebbles are sometimes denominated Gouttes d'Eau. When cut with facets and set in rings, they are readily mistaken, if viewed by daylight, for diamonds. The coarse varieties of topaz may be employed as a substitute for emery in grinding and polishing hard substances. Topaz is cut on a leaden wheel, and is polished on a copper wheel with rotten stone. It is usually cut in the form of the briliant or table, and is set either with gold foil or or à jour.' The white and rose-red are most esteemed. (Dana, *Manual of Mineralogy*,)—*Eng. Cyc.*

Beautiful Topazes of various kinds are found n the Burmah dominions and in Ceylon, in which last mentioned country, a genuine greenish yellow coloured Topaz is improperly called, Thunberg tells us, the yellow Tourmalin (Kaneke Turemale, *Cyng*), a light coloured smoky Topaz is there as improperly called a yellow crystal Kaha Palingu, *Cyng.*) and a dark coloured smoky Topaz is mistaken for a brown Crystal, and call-Tillia Palingu by the Cyngalese.

Oriental Topazes are a variety of the genuine perfect Corundum and are said by Mineralogists to differ from the Occidental Topaz or that which comes from Saxony and Siberia by the latter containing a greater proportion of Silex.—*Ains. Mat Med. page* 167.

(8235) TORENIA, a genus of Plants of the natural family of *Scrophulariaceæ*, found in India, the tropical parts of Australia, and in South America. *T. Asiatica*, a species found n almost every part of India, is described by Rheede as having the juice of its leaves employed as a cure for gonorrhœa on the coast of Malabar.—*Eng Cyc.*

(8236) *Torenia asiatica*, Linn. (Caela dola, *Sans.*) the juice of the leaves is considered in Malabar a remedy for gonorrhœa —*O'Shaughnessy, page* 477.

(8237) TORPEDINIDÆ, the Torpedoes, a family of Fishes belonging to the order *Plagiostomi*, and the sub-order *Raiinæ*.

Torpedo, the principal genus, was founded by Dumeril upon the *Raia Torpedo* of Linnæus, and some other species, distinguished by their having the tail short and moderately thick, and the disc of the body nearly circular, the anterior margin being formed by two produced portions from the head, which, inclining sideways, join the pectorals: the space between the head, the pectoral fins, and the branchiæ is occupied by small vertical hexagonal tubes, which are filled with mucous matter, and largely provided with nerves from the eighth pair. The situation of these honeycomb-like cells, which constitute the electrical apparatus, is indicated on the upper surface by a slight convexity on each side of the head. Cuvier and Risso consider that several species have been confounded under a common name, and the latter of these authors has characterised four species of *Torpedo* in his 'Histoire Naturelle del'Europe Meridionale.' They are—

1. *Torpedo Narke*, which he describes as being yellowish-red above, and having five ocellated spots.

2. *Torpedo unimaculata*. This species has the body above fulvous, spotted with whitish spots, and one oblong ocellated spot in the middle of the back. The tail is more elongated and slender. It is said to have the electrical apparatus scarcely visible, and to give but very slight shocks.

3. *Torpedo marmorata*. Body flesh-coloured, and having brown spots and sinuous markings, producing a marbled appearance: tail thick above rounded.

4. *Torpedo Galvani*. Body fulvous, immaculate, but margined with black. Fleming refers the British Torpedo to the third of these species *Torpedo marmorata*.—*Eng. Cyc.*

(8238) TORPEDO. [TORPEDINIDÆ.]

(8239) TORS. By the natural weathering of rocks exposed to atmospheric vicissitudes, the perishable parts are removed and the more resisting portions remain. In rocks which manifest peculiar arrangements of joints or natural divisions, the blocks and masses defined by their intersections often appear in cubical, subcolumnar and other characteristic shapes. To masses more or less characteristic in figure, left by the decay of surrounding parts in prominent situations, the name of 'Tor' is applied in the granitic tracts of Devon and Cornwall.—*Eng Cyc.* Tors are of very frequent occurrence in the granitic tracts of Southern India, where, as in Hyderabad in the Dekhan and in the Ceded Districts, the piled up masses often are seen assuming the appearances of artificial structures.

(8240) TORTOISE SHELL.

Ecaille de tortue, FR.
Schilpad, GER
Kachakra, GUZ. HIND.
Sisik Kurakura also Sisik panu. MAL.
Scaglia de Tartaruga, IT.

The scales of the tortoise; extensively used in the manufacture of combs, snuff-boxes, in inlaying, &c. The goodness of tortoise shell depends mainly on the thickness and size of the scales, and partly on the clearness and brilliancy of the colours. Tortoise shell abounds in the seas of the Indian Archipelago, which is considered superior to that obtained from Singapore, the African Coast, the West Indies, and the Laccadive and Maldive Islands.—*Faulkner.* In Ceylon the marginal pieces of tortoise shell are used at Point de Galle in the manufacture of bracelets and necklaces formed of a chain of shell, it resembles amber in appearance; these bear a higher price than such as are formed by the darker shell. In Ceylon there is a great demand for tortoise-shell for the manufacture of Combs which are worn by males as well as females among the Cyngalese. In the numerous excesses into which English costume has been carried the size of the back comb worn by ladies has never attained that of the Cingalese men, who also wear a narrow long bent Comb across the forepart of the head—the lighter coloured shell is most esteemed by them. Five pounds is a moderate price for a tortoise shell back comb, which increases in value according to the size and quality of the shell: hair pins of tortoise-shell are worn by the women: gold and silver being substituted for full dress: these hair pins are among the articles purchased by passengers in the steam-boats.—*Rhode, M S. S.*

For the Malay Tortoise-shell "*Sisik panu,*" is literally, "tortoise scales." The only part of the sea tortoises or turtles held of much value by the natives of the Indian islands is the shell. Tortoises are found in all the seas of the Malay and Philippine Archipelagos, but the imbricated kind that yields the finest shell is most abundant in those of Celebes and the Spice Islands, as far as the coast of new Guinea. The parties chiefly engaged in their capture are the Rajahs or Malay sea nomadic hunters, of whom the turtle is the principal game. These people distinguish four species of sea-turtles to which they give the names of kulitan akung, ratu, and boko. The last is the panu of the Malays and the green esculent turtle, of which the carapace is of no use, the animal being valued only for its flesh to sell to the Chinese and Europeans, for among the Mahomedans it is unlawful food. The three first named species all yield a marketable shell. The ratu, which signifies king or royal turtle, is said to be of great size, measuring from five to six feet in length, but is not often taken, and the shell is of inferior value. All the finest shell is afforded by the first, the kulitan, the name, in fact, signifying "shell turtle." A very interesting account of the turtle fishery of Celebes, contained in the 16th volume of the Transactions of the Batavian Society of Arts and sciences, describes the animal as follows. "The first named" (the kulitan) is the kind which, on account of its costly shell, is the most prized. It is the so named *caret* tortoise. The shell or back of this creature is covered with thirteen shields or blades, which lie regularly on each other in the manner of scales, five in the centre of the back and four on each side. These are the plates' which furnish such costly tortoise shell to the arts. The edges of the scales of the back are further covered with twenty-five thin pieces joined one to another, which, in commerce, are known under the appellation of 'feet' or 'noses' of the tortoise. The value of the tortoise shell depends on the weight of each 'head,' by which expression is understood the collective shell belonging to one and the same animal. Such is the article of commerce so much in request, both for the Chinese and European markets. Shells, which have white and dark spots that touch each other, and are, as much as possible, similar on both sides of the blade, are in the eyes of the Chinese, much finer, and, on that account, more greedily brought by them than those which want this peculiarity. On the contrary, shells which are reddish rather than black in their dark spots, which possess little white which are more damasked than spotted; in a word, of which the colours, according to Chinese taste, are badly distributed, are less valued. The caprice of the Chinese makes them sometimes value single heads' at unheard-of prices, such for example, as go under the name of 'white heads,' for the varieties of which they have peculiar names. It is impossible to give an accurate description of these varieties, and their subdivisions, for these depend on many circumstances unappreciable to our senses. It is enough for me to observe that such heads as possess the above named qualities, that is, are very white in their blades, and have the outer rim of each blade, to the depth of two or three fingers, wholly white, and the weight of which amounts to two and a half catties, qualities that are rarely found united, may be valued at 1000 Guilders or even more (above 24£ per pound, avoirdupois). The 'feet' or 'noses' of the tortoise-shell are in demand only in the Chinese market. Whenever the two hinder pieces of these have the weight of a quarter of a catty (between 5 and 6 ounces), which is seldom the case, they may reach the value of fifty guilders, or more. The whole shell of a tortoise seldom weighs more than three catties (four pounds), notwithstanding, it is asserted that there occur 'heads' of four and five catties. Tortoise-shells are sometimes found of which the shell, instead of thirteen blades, consists of a single undivided one. The Bajos call this, which is rarely met with, loyong (brass?) The usual modes by which these people catch the tortoise are the adang (intercepting), the harpoon, and the net To these we add the simplest of all, namely, falling on the females when they resort to the strand to lay their eggs. This is also the most usual, I may say almost the only way by which the inhabitants of the coast catch this animal. They need nothing nore than, as soon as they have got the creature n their power, to turn it on its back, when nable to recover itself it lies helpless. It ometimes, also, falls into the hands of the wellers on the coast, through means of their shing stakes, into which it enters like the sh, and from which it can find no outlet, but remains imprisoned in the innermost chamer. When the Bajos have caught a tortise, ey kill it immediately by a few blows on the ead. They then take its upper shield, or the ack itself off, being the only thing about the nimal that has value. But as the shells adhere st to each other there would be danger of tearng them, if they at once pulled the plates sunder, they usually wait three days, in which me, the soft parts become decomposed, and e plates are loosened with very little trouble. he Indian islands furnish, I believe, the largest pply of tortoise-shell for the European and hinese market, the chief emporia being Singare, Manilla, and Batavia, from which are ported yearly about 26.000 pounds; and one lf of this quantity is from Singapore.—*Crawrd Dict. page* 439.

Mr. Morrison tells us that, Tortoise-shell is e crustaceous covering of the *Testudo imbrita*, a native of the shores of most of the Indian ands ; and that the best comes from the Spice lands and New Guinea, but it is collected all over e Archipelago and West Pacific. The common me is hawk's bill tortoise. The shell is thicker, arer, and more variegated than that of any her species, and constitutes the sole value of e animal. It is heart-form, and consists of irteen inner with twenty-five marginal divions. The middle side-pieces are the thickest, gest and most valuable ; the best is in large tes, free from cracks or carbuncles, and almost nsparent. The small, broken and crooked eces are worthless. The Chinese use large antities in the manufacture of combs, boxes, s, &c. During the Company's monopoly, torse-shell was brought to the Chinese market for portation to England, but it is now carried to gapore, and very little is brought to Hong-kong e price varies from $ 1000 down to 200 per cul, according to quality.—*Morrison.*

The Madras Exports of Tortoise Shell was lbs. 8, value Rs. 2,204, in 1854. At the Madras hibition the epidermoid plates which overlap back shell of the Marine Turtles (Chelone) re transmitted from Travancore, apparently plates. Another epidermal production, called rtoise shell, from Madura and other inland alities was exhibited, but the specimens were little value.—*M. E. J. R.*

(8241) TOUR: Cajanus Indicus.

Togari, Can.
Tuvar, Hin.
Turi, Mah.
Tovare, Ta.
Kandula. Te.

(8242) TOUR : BURRIE TOUR—Cajanus Indicus, Cytisus Cajan. Pigeon pea.—Large Dhal.

Toor dhal, Hind.
Thovary purpoo, Tam.

This is sown in fields at the commencement of the rains in June and sometimes much later; it is ripe in December. The seeds are sometimes ground into flour or split like dry peas : for the latter they are an excellent substitute. There are several varieties, which sell from 30 to 40 seers for the rupee. Is partly sown along with Ragi like Bullur, and partly in full in dry lands. The quantity of it grown in Mysore is not sufficient for the wants of the people, and it is consequently largely imported into that district from Baramahal and Bellary.

(8243) TOURMALINE (*Schorl*), a mineral occurring crystallised. Primary form a rhomboid ; secondary forms, prisms with from 3 to 12 sides, terminated by very irregular summits. Cleavage parallel to the faces of the primary form. Fracture uneven, conchoidal. Hardness : scratches glass easily. Electricity : according to Hauy the transparent varieties when heated become electric ; the termination of the prism which presents the greater number of faces becoming positive, while the other end becomes negative. Colour white, brown, blue, yellow, green, red, and black. The blue variety is called *Indicolite* and the red *Rubellite. Schorl* is a name formerly given to black tourmaline, Lustre vitreous. Transparent, translucent, opaque. Specific gravity 3.069 to 3.076. Before the blow-pipe all the varieties fuse readily with borax, producing at first slight effervescence.

Tourmaline occurs most commonly in primary rocks, especially in granite, gneiss, and mica slate. The red variety, or rubellite, is found in Siberia ; the blue, or indicolite, at Uto ; the green in Brazil ; the black in Devonshire and many other places. The composition of tourmaline is extremely various. That of the red appears, from the analysis of Vauquelin, to be the simplest, consisting of

Silica	42
Alumina	40
Soda	10
Oxide of Manganese	7
	99

Some varieties contain also potash, lithia, lime, magnesia, oxide of iron, and boracic acid. The proportions of these constituents are extremely variable, and no one variety contains all the enumerated substances. The black tourmaline from Devonshire yields nearly 19 per cent. of oxide of iron, and that of Eibenstock nearly 24 per cent. of the same oxide.

The word Tourmaline is a corruption of the name in Ceylon, whence it was first brought to Europe. *Lyncurium* is supposed to be the ancient name for common tourmaline ; and the red variety was probably called *Hyacinth.*

The red tourmalines, when transparent and free from cracks, are of great value, and afford gems of remarkable beauty. They have all the richness of colour and lustre belonging to the ruby, though measuring an inch across. A Siberian specimen of this variety, now in the British Museum, is valued at 500*l*. The yellow tourmaline from Ceylon is but little inferior to the real Topaz and is often sold for that gem. The green specimens, when clear and fine are also valuable for gems.

Tourmaline on account of its property of polarising light, is used largely in the manufactures of polarising instruments. (Dana, Manual of Mineralogy.)—*Eng. Cyc. p.* 1084

(8244) *Yellow tourmaline.*—Among the Ceylon diamonds that are seen for sale in Maulmain, is a yellow jewel resembling a topaz; but which Mr. Mason finds on examination to be yellow tourmaline.

(8245) *White tourmaline.*—An occasional crystal of white tourmaline is seen among the crystals of the black variety in specimens from the Shan states; but he has never met with it in the Provinces.

(8246) *Red tourmaline.*—Red tourmaline is found in Burmah, though it is not seen at Moulmein Jameson says the king of Ava gave a specimen to Symes which was valued at five hundred pounds in England.—*Mason.*

(8247) *Schorl*, or black tourmaline, is found in Madura, in great abundance, also in quartz near the mouth of Tavoy river on the east side and also at the foot of the eastern mountains, near the head waters of the Dahgyaine, north east of Maulmain. These are the only localities where Mason met with this mineral. In both, the crystals are numerous, and in Tavoy they are large, but not so handsome as seen in foreign specimens.—*Mason.*

(8248) *Green Tourmaline.*—A green jewel that cannot be distinguished by the eye from beryl, is brought with the Ceylon diamonds; it is however, green tourmaline; as may be ascertained by a very simple test, for beryl scratches quartz, but tourmaline is scratched by quartz.—*Mason.*

(8249) *Ceylon Diamonds.*—White jewels of an inferior quality are often offered for sale in Maulmain under the name of Ceylon diamonds, but they are usually made from green tourmaline. White tourmaline, is a rare mineral, but the green variety being common, the jewelers by exposing it to heat expel its color and it becomes white.—*Mason.*

(8250) TOURNEFORTIA, a genus of Plants belonging to the natural order Boraginaceæ, so named by Linnæus in honour of Joseph Tillon de Tournefort. It is characterised by having a salver shaped or rotate corolla, of which the throat is naked; the stamens included within the tube of the corolla; the stigma is peltate, and the fruit consists of a berry which contai 4 1-seeded nuts. The species are about 50 i number, forming small shrubs or herbs, diffu ed through the hot parts of the world, as t West Indies, South America, Indian islands, an India.—*Eng. Cyc. p.* 1084.

(8251) TOWELS of different sizes are chief made in the districts of Cuddalore, Chinglep and in the outskirts of Madras and of a quali equal to those of English manufactures. At t Madras Exhibition of 1855, there was award to Chengalroya Chetty, for the best Towels fro Cuddalore, a prize of Rupees 50.

(8252) TOYS.

Speelgoed, DUT.
Jouets, Bimbelots, FR.
Spielzeug, Spielsachen, GER.
Khail, also Killownee HIND.

Rumakra, GUZ.
Trastulli IT.
Shai-i bazee, PERS.
Igrushki, RUS.
Dijes, Juguetes de ni nos, SP.

Are playthings, baubles, and trifling ornamen of all sorts, made expressly for the amusement children.—*Faulkner*

(8253) TRADESCANTIA, a genus of Plan belonging to the natural order *Commelinace* which was so named in honour of the Englis botanist John Tradescant, who was gardener t Charles I. The species are natives of Ameri and of India. Many of them, being of a high ornamental nature, are cultivated in flower-gar dens; a few are used medicinally in the countri where they are indigenous. Thus *T. axillari* according to Rheede, is used in India as an a plication to the abdomen in cases of tympanites and Martius describes the stem and leaves of *diuretica* as being employed in Brazil as emo lient applications in rheumatic pains, intestin derangements, and in retention of urine; whi in North America *T. Virginica* is employed i cases of bites of venomous spiders, as well some other species, whence it has obtained t name of Spider-Wort, but it is doubtful wheth they possess any other than simple emollie properties. The hairs of the stamens of th plant exhibit a circulation, in the cells of whic they are composed.—*Eng. Cyc.*

(8254) TRAGACANTH, GUM DRAGON.

Samagut-kateera, kaseera, Katira, ARAB.
Gommi astraganti, FR.
Traganth, GER.

Kattera, GUZ. HIND.
Tragacantha, LAT.
Vadomocottay pisin, TAM.

A gum produced, according to some author by a species of *Astragalus*, growing in Persi and Turkey. It is more costly, and extremel different in many of its properties from Gu Arabic. The finest kind occurs in twisted vermicular, rounded or elongated pieces, al most transparent, whitish, brittle, inodorou with slightly bitter taste. It is also foun in large tears of a vermicular form, a red dish color, and mixed with impurities. It i used in topical dyeing, and in pharmacy for making powders into troches, &c. (*Waterston*).—*Faulkner*. The source of this product however, seems to be several plants, according to the different colleges it is the Gummy exudation of Astragalus gummifer, *Lab.* and other species, E., A., verus, *Olivier*, L. and E., A. creticus, *Lamarck*, D. The τραγάχανδα of Dioscorides was no doubt a plant of the same genus as that which now yields Tragacanth. Sibthorp considers *Astragalus aristatus*, L'Hert, to be the plant. Arab authors describe it by the name *kusera* or *kutira*, for which, in India, *kuteera* is substituted. A substance known by this name is produced both in the North-west and in the Peninsula of India by *Cochlospermum Gossypium* and in Pegu according to McClelland by several species of Sterculia. Tournefort adduced *A creticus* of Lamarck, a native of Mount Ida in Crete, to be the plant yielding Tragacanth. Labillardiere describes *A. gummifer* a native of Mount Libanus in Syria, as one of the plants; while Olivier states his *A. verus*, inhabiting Asia Minor, Armenia, and northern Persia, as yielding the largest quantity of Tragacanth. Dr. E. Dickson, Physician to the consulate at Tripoli, when travelling in Koordistan, collected specimens of the plants which he ascertained to yield Tragacanth. These he gave to Mr. Grant, British Consul at Erzeroum, by whom they were sent to Dr. Lindley, who determined that the white or best variety of Gum Tragacanth is yielded by *Astragalus gummifer*, and the red or inferior kind by his *A. strobiliferus*. Dr. Dickson, when in England, favoured Dr. Royle with the following observations: "Besides the two last-named species, I observed also a third variety that gave gum Tragacanth, which unfortunately I lost when my things were robbed at Hassan-kaleh. From the Koordish mountains being covered with many species of Astragalus, I should think it not unlikely that other varieties of this genus may hereafter be discovered yielding the gum."

(8255) *Astragalus Dec. Diadelph. Decand.* Linn. Calyx 5-toothed. Corolla with an obtuse keel. Stamens diadelphous. Legume 2-celled, or half 2-celled in consequence of the dorsal or lower suture being turned inward, *Dec.*

Sectio Tragacanthæ.—Petioles permanent, hornlike. Stipules adhering to the petioles.

(8256) *Astragalus Verus. Oliv.* L. E. Flowers yellow, axillary, in clusters of 2 to 5, sessile. Calyx tomentose, obtusely 5-toothed. Leaflets to 9 pairs, linear, hispid. A native of Anatolia, Armenia and Northern Persia, yields Tragacanth, which is collected from July to September. Used in Persia, exported to Europe and also to India.—Oliv. Voy. 3, t. 44; Nees von E. 329.

(8257) *Astragalus Gummifer. Labill.* E —Flowers 3 to 5 axillary, sessile. Calyx 5-cleft, together with the legumes woolly. Leaflets 4 to 6 pairs, oblong, linear, smooth. A native of Mount Lebanon, also, of Koordistan, where it yields white Tragacanth, but which Labilladiere represents as vermicular in form.

(8258) *Astragalus Creticus. Lam.*—Flowers axillary, sessile, aggregate. Calyx 5-partite, with feathery setaceous lobes rather larger than the corolla. Leaflets 5 to 8 pairs, oblong, acute, tomentose. Mount Ida in Crete, where it yields a little Tragacanth.

(8259) *Astragalus Aristatus. L'her.*—Peduncles very short, usually 6-flowered; calycine teeth long and setaceous; leaves with 6—9 pairs of oblong, linear, mucronate, pilose leaflets; legumes scarcely half bilocular. A native of the Alps of Europe, also of Greece. Sibthorp states that this species yields a gum called τραγοχανδα in Greece, which was exported to Italy. Landerer has lately ascertained that Tragacanth was yielded by this species on the hills near Patrass, and exported to Venice and Trieste, or as Levant Tragacanth to Marsellies and Ancona: (e)

(8260) *Astragalus Dicksonii. Royle.* (*A. strobiliferus*, *Lindley*, not of Royle, Him. Bot. p. 199)—Flowers capitate in an ovate, sessile, axillary strobile. Bracts imbricate, pinnated, tomentose. Calyx feathery, 5-cleft. Segments of the corolla equal. Leaflets 3-paired, woolly, oval, awned at the apex, narrow at the base, *Lindley.* As Dr. L. has inadvertently named this species *A strobiliferus*, there being already one of that name, Dr. Royle named it after the discoverer of the plant, who also found that it yielded a reddish coloured Tragacanth. Tragacanth exudes from the above plants either naturally or from wounds, and hardens in various forms. It is imported into England from Smyrna, the Levant, and also from Greece. It is found in commerce either of a white or a reddish-yellow colour, in broad thin flakes, or in tortuous vermicular pieces; the former is the best, and most common there. It is white or greyish, semitransparent, tough, horn-like, and tasteless, and being a little elastic, is with difficulty reduced to powder, unless heated to 110°. In contact with cold water, it absorbs a certain portion, swells, becomes adhesive and diffused. It does not dissolve except in boiling water, when some change is supposed to take place, a great portion, however, separating again. It is insoluble in Alcohol. Tragacanth appears to consist of two distinct gummy principles. Bucholz and Guerin Varry found of common Gum or Arabin from 53 to 57 per cent., and of Bassorin 33 to 43 parts, with water and a little starch, the presence of the latter producing a blue colour with Iodine. The *Arabin* rather resembles than is identical with Gum Arabic, for, as first pointed out by Dr. Duncan, its mucilage is not precipitated by Silicate of Potash. The *Bassorin* is like that found in Gum Bussorah, and other imperfectly soluble gums. It is sometimes called *Tragacanthine*, is solid, colourless, without odour or taste, insoluble in water, but absorbing it and swelling up. Nitric acid converts it into Oxalic and into Mucic acid. Sulphuric acid changes it to a saccharine substance, which is not susceptible of Alcoholic fermentation. Guibourt, however, considers Tragacanth to consist of a peculiar Mucilaginous principle, with a little Starch and Ligneous fibre.—*Royle.*

(8261) TRAGIA, a genus of Plants belonging to the natural order *Euphorbiaceæ*, named after Tragus, a German botanist, whose real name was Bock. The species are found in India and in America, are climbing in habit, and some are remarkable for stinging as violently as nettles. *T. cannabina* is so named from its leaves resembling those of the *Cannabis*, or Hemp, and of which the roots given in infusion are considered diaphoretic and alterative. *T. involucrata* is a small plant without taste or smell, but the native physicians of India consider it calculated to strengthen the system in cachectic states of the constitution and in chronic cases of syphilis. *T. volubilis*, which is a stinging climber, and has a very acrid juice, is employed in conjunction with common salt for the destruction of some kinds of ulcers.—*Eng. Cyc.*

(8262) TRAGIA CANNABINA, Lin. ROOT OF THE HEMP LEAVED TRAGIA.

SirrooCanchorie vayr, TAM.
Kanchkoori ke jurr, DUK.
Tsinna Doolagendie vayree, TEL.
Casaghinnie, SANS.

This root sometimes called in Tamul "*Coorundootie vayr*," has in its dried state but little taste or smell, though in its more succulent condition, it is said to have an agreeable odour. It is considered as diaphoretic and alterative, and is prescribed in decoction together with other articles of the same class to correct the habit. An infusion of it is also given as a drug in ardent Fever.—*Ains. Mat. Med. p.* 114.

(8263) TRAGIA INVOLUCRATA. Roxb. iii. p. 576.

Bichittee, BENG
Canchorie vayr, TAM.
Doolaghondi vayroo, TEL.
Canchorie Root. ENG.
Doostparisha, SANS.

Hairs sting violently; roots given by the Vaidas as alterative in cachexia and venereal diseases. (*Ainslie.*)—*O'Shaughnessy, page* 562. This small root has in its dry state no sensible taste or smell; the Vyteans however reckon it amongst those medicine which they conceive to possess virtues in altering and correcting the habit in cases of Mayghum, (Cachexia) and in old venereal affections attended with anomalous symptoms, and Rheede, in speaking of the same root, has these words "Conducit in febre ossium, ac servit pro pruritu corporis." He further adds in decocto data, urinam suppressam movet.—*Ains. Mat. Med. p.* 75.

(8264) TRAGOPOGON (from τράγος, a 'goat,' and πώγων, beard), a genus of Plants belonging to the natural order *Cichoraceæ*, which is usually considered only a tribe of the great order of *Compositæ*. The genus *Tragopogon*, or Goats Beard, is so named from the long silky beard or pappus of the seeds. The genus is distinguished by having a simple involucre of many leaves. Receptacle naked. Pappus stalked, plumose. Achenia longitudinally striated. The species are found in the temperate parts of Europe and of Asia. One, *T. gracilis*, is found in the Himalaya Mountains, of which the leaves are eaten by the natives as lettuce is in Europe, but without being blanched. The best-known species however is *T. porrifolius*, or Salsify, which is occasionally cultivated in England but frequently in France and Germany. The English *T. pratensis* may be cultivated for the same purpose. The roots of Salisfy are the parts esteemed: they are long and tapering, their flavour mild and sweetish, and are boiled or stewed like carrots. The stalks of year-old plants are sometimes cut in the spring, and when similarly dressed, taste like asparagus.—*Eng Cyc.*

(8265) TRAGOPOGON PORRIFOLIUS, SALSAFY. An excellent vegetable cultivated for its white roots which are mild and sweet flavoured, requires culture similar to carrots, held in high estimation by the French. The young shoots are sometimes used as asparagus, which in flavour they resemble. A native of England. Raised from seed.—*Jaffrey.*

(8266) TRAP. This geological term, one of most general use and comprehensive signification, seems to have been originally employed by Bergman and the German and Swedish miners, in the sense of the word 'trappa,' Swedish, or 'treppe,' German, meaning stairs, and the aspect of the rocks now called Trap, in successive terraces on hill sides, is such as often to justify the use of the word. In modern works on topographical geology a very great proportion of the ancient rocks of fusion are familiarly called Trap, not because they have any certain mineral composition, but because, whether granitic, sienitic, prophyritic, or hornblendic, they appear under particular relations of position or geological age. In this sense the term is purely geological, and we have as distinctive designations Eruptive Trap, Contemporaneous Trap, Overlying Trap, Interposed Trap, &c. By other writers the term is restricted so as to leave out such massive and generally deep-seated rocks as granite, or even contracted to the hornblendic and felspatho-hornblendic rocks, which appear as dykes, interposed beds, and overlying masses. It thus appears to be a collective term more convenient than precise. In a geological sense it may be replaced by descriptive words, such as Irruptive, nterposed, Overlying, &c, and in a mineralo- ical sense it is advantageously changed for Basalt, Greenstone, Felsparite, Sienite, Serpen- ine, Diallage Rock, &c.—*Eng. Cyc.*

The greatest outburst of Trap in the world, s perhaps that described by Colonel Sykes, as he Trap formation of the Dekhan, the Editor as (*Barometrical Sections of India* page 4) re- arked thus :

Volcanic trap is visible, however, in the bed f the Jumna, near Allahabad, in latitude 25° orth, and in the ascent to Mussoorie, by Kuer- oolee, the granite re-appears and it makes a reat eruption at the Chur Mountain, above 2,000 feet high, on the southern slopes of the limalayas. But near Gungotri, at the source f the Ganges, is described to be the grand gra- itic axis of the Himalayas, and one of the great- st and most magnificent out-bursts of granite 1 the world. It traverses these mountains in umerous veins—westwards towards the Bar- ıda pass, and eastwards towards Kamet, Nan- adevi and Nandakot, upraising the metamor- hic schists which form the highest peaks of the owy range. Lower down, on the southern opes of those mountains, from 8,000 to 1,500 et in height, uplifted stratified rocks rest on e gneiss and granite, consisting of hornblende ck and slate, limestone, sandstone, great beds f quartz, clay, mica, chlorite, and talc slates, d lower still, at latitudes of 3,000 to 2,500 et above the level of the sea, gravel, boulders. arl with coal, recent clays and sandstones from e Sewalik or Sub-Himalayan Mountains. It in these hills that the extensive fossil remains ere discovered, and the low alluvial tract, nown as the Terai, is the valley formed by the nction of the Sewalik with the Himalayan in- ined rocks. To the south of this the highest arts of Central India occur along the Arravalli Iountains and the Vindhya range and are from ,000 to 3,000 feet in altitude. There are, here, rce inclinations, the one declivity sinking from e Arravalli Mountains towards the valley of e Indus, another falls from the Vindhya range orthwards to the Ganges, and the third is uthwards to the Nerbudda. Granite is here, lso, the upraising rock, it bursts out at Oudey- ore, Kaunmore, Banswarrah, and Rajpoor, rough the gneiss, and mica, and chlorite slates, mestone and sandstone. It was to the east of is central tract that the first great deposit of al was found lining both banks of the Da- oodah, though it has, since then, been discover- l in numerous other provinces of our eastern npire. It is in Central India, also, that the olcanic rocks to any extent, are first observed s they spread east and west from Neemuch in e form of basalt, basaltic greenstone, green- tone and greenstone amygdaloid, and south- ards by Oujein and Saugor across the Vindhya, ssuming the structure of columnar basalt in their steep descent to the Nerbudda. The trap crosses this river and spreads over all the Aurungabad province down through Candeish and the Concan to Bombay, and southwards to Malwan in latitude 60° north, its southern limits being observed south of Punderpoor, through Bejapoor to the right bank of the Kistnah, in the valleys near Hoomnabad, where it is found between and beneath but never penetrating the laterite hills south and east of Beder and at Maharajahpettah, thirty miles west of Hyderabad. The eastern edge of this vast tract of trap rocks, after crossing the Nerbudda to the south, skirts the town of Nagpore in Berar, passes Nandier and to the westward of the city of Hyderabad to its southern limit, just mentioned. South of this as well as to the eastward, the trap only appears as great dikes, from fifty to a hundred yards broad, which run east and west parallel with each other. These dikes can often be traced for a hundred and fifty miles together, bursting through the granite and other rocks, tearing the highest of the hills asunder and filling the chasms and crevices with its dark and compact structure. In these dikes the elements of the trap rock assume a variety of appearances, greenstone, porphyritic greenstone, basaltic greenstone, hornblende rock, and basalt ; they are particularly numerous in Hyderabad, the Balaghaut Ceded Districts, the Carnatic and Mysore almost to the southern Cape of the Peninsula, and, with very rare exceptions, run due east and west.—*Barometrical Sections of India.*

(8267) TRAPA, a genus of Plants belonging to the natural order *Onagraceæ.* The fruit of *Trapa* is furnished with spines, and the species are commonly called Water-Caltrops, from the plants floating on the surface of lakes, and on that of slow-running waters. They are found in the temperate parts of Europe and of Siberia, in Cashmere, India, Cochin China, and China. The genus is characterised by having a 4-parted adherent calyx ; petals and stamens 4 ; ovary 2-celled, with solitary pendulous ovules. The fruit is hard, indehiscent, 1-celled and one seeded. The seed is large and exalbuminous ; the two cotyledons very unequal. The floating habit and clustered leaves easily distinguish these plants. The leaves under water are cut into capillary segments, and the petioles are tumid in the middle.—*Eng. Cyc.* The fruit of *Trapa natans* and *T. bispinosa*, is called *singara* ; these are sold in all the bazars, and form a considerable part of the food of the inhabitants of Cashmere, where it yields the Government 12,000*l.* of annual revenue. Mr. Moorcroft mentions that Runjeet Sing derived nearly the same share. From 96,000 to 128,000 loads of this nut are yielded annually by the lake of Ooller alone. The nut abounds in fecula, and is armed with two singular projecting spines. In China the kernel is used as an article of food, being roasted or boiled like the potatoe. (*Royle*, p. 211.)—*O Shaughnessy, page* 331.

(8268) TRAPA BICORNIS is distinguished from T. bispinosa by its two horns being recurved and very obtuse. It is carefully cultivated in lakes, ponds, and other receptacles of water.

(8269) TRAPA BISPINOSA. Two-spined water Caltrops.

Singhara, Hind.

Much cultivated in tanks during the rains. The seed is much eaten boiled or roasted.—*Genl. Med. Top. p.* 180. *T. bispinosa*, Roxb. ('Corom. Pl.,' ii. 234), has the nut with two opposite, straight, barbed, spinous horns, noticed by Sir W. Jones under the Sanscrit name of Sringata: it is commonly known all over India by the name Singara, both names having reference to its horned appearance. It is also found in the Lake of Cashmere. In India the nuts are sold in all the bazars, as their farinaceous kernels are much esteemed by the Hindoos. A species called by the same name, Singhara, forms a considerable portion of the food of the inhabitants of Cashmere.—*Eng. Cyc.* The Singhara is a water plant, and is cultivated in many of the tanks. There are two kinds,—one with a hard thick shell, and the other with only a soft skin. The former, when ripe, has the appearance of a bullock's head, from two sharp spear-like processes growing from it. The fruit when boiled resembles a chesnut, and is sold in the bazar. The seed is also made into a coarse flour, and cakes are made from it; both fish and tortoise feed upon the thin-shelled kind. In some parts of the country, great care is taken to preserve the seed for planting the following season, which is done by treading it into the beds of tanks and such places. The fruit is fit to be taken at or about the close of the rains.—*Jaffrey.*

(8270) TRAPA NATANS, the European species, is remarkable for its fruit with 4 spines, being of a blackish colour and large size, and its seed, which nearly fills it, being farinaceous, and good to eat, whether raw, roasted, or in soups, and is somewhat like a chestnut in taste. It was known to the Romans by the name Tribulus. Pliny says (lib. xxi., c. 58), "About the rivers Nilus and Strymon the inhabitants gather it for their meat."—*Eng. Cyc.* In China where the water is very shallow, a great part of it is covered with the *Trapa bicornis*, a plant called "*ling*" by the Chinese. It produces a fruit of a very peculiar shape, resembling the head and horns of a bullock, and is highly esteemed in all parts of the empire. Fortune saw three distinct species or varieties, one of which has fruit of a beautiful red colour.—*Fortune, page* 27.

(8271) TRAP TREE, a species of *Artocarpus*, which furnishes the Gutta used as birdlime. The fibre of the bark is used for fishing lines, cordage, and nets at Singapore.—*Royle.*

(8272) TRAVANCORE. At the Madra Exhibition of 1855, the most valuable of th drug collections in regard to extent, variety an careful method in which they had been put up was forwarded by E. Waring, Esq., Residency Surgeon, Travancore. It consisted of 24 specimens, accompanied with a descriptive catalogue of the drugs, and well dried specimens o the plants—the numbers being attached, corresponding with the vegetable products. This collection contained *Star Aniseed*, some remarkabl *Galls, Wood Aloes, Butea Kino, True Kino Mutty Pal*, &c., also the root of a *Smilax* which is reported to be a good substitute for Jamaica sarsaparilla, *Cocculus Indicus, Nux Vomica Zedoaria*, &c. *Croton Tiglium, Aristolochia Indica Curcuma Montana.* The series was admirabl arranged, was a source of much attraction durin the Exhibition, and the Jury awarded Mr Waring a 1st Class Medal.—*M. E. J. R.*

(8273) TRIANTHEMA, a genus of Plant of the natural order *Portulaceæ*, so named from τρεῖς, three, and ἄνθος, a flower, in consequenc of the flowers growing in threes, in the axils o the leaves. The species occur as weeds in ever part of the plains of India. *T. obcordata*, lik the plants of the family, to which it belongs, i employed by the natives of India as a pot-herb but the nauseous and bitter roots of *T. monogyn* are said by Dr. Ainslie to be employed as a purgative by the inhabitants of Hindustan.—*Eng Cyc.* Dr. Wight gives Trianthema decandra 296 obcordata 288.

(8274) TRIANTHEMA DECANDRA.

Beeskhopra, Duk.	Sweet punarnavi, Sans

Root size of small finger, light brown out side white within, aperient. "Four pagodas weigh of bark of the root made into a decoction with lb. water and boiled down to ½ a lb. will ope the bowels." (*Ainslie.*)—*O' Sh. p.* 353.

(8275) TRIANTHEMA OBCORDATA Roxb. formerly his *T. Monogynia.* Ainslie, vol. ii, p. 370.

Nusurjinghi ke jur, Hind. Punarnavi. Sans.	Sharvalay Keeray Tam.

The root is found in bazars; colour pale much wrinkled, bitterish, and rather nauseous t the taste, considered cathartic, and given in powder to the extent of two tea-spoonful twice dail with a little ginger.—*O'Shaughnessy, page* 353 A troublesome weed, springs up every where the young leaves used as spinach, when somewhat old mixed with others and used as greens—*Jaffrey.*

(8276) TRIAS OBLONGA. Many of the mango trees have a species of trias growing on them, the smallest plant of the orchid tribe that is seen in the Tenasserim Provinces.—*Mason.*

(8277) TRIBULUS (τρίβολος, three spiked o pointed), a genus of Plants belonging to the natural order *Rutaceæ*, the fruit of which is armed with prickles. It has a 5-parted calyx ; petals 5, spreading ; stamens 10 ; ovary superior ; capsules 5, gibbous, spiny, many-seeded. The species are found in the south of Europe and the sub-tropical and tropical parts of the world, with diffuse, often procumbent stems, with solitary white or yellow flowers in the axil of the leaves. *T. terrestris* is sometimes cultivated in the gardens of the West Indies on account of the sweet scent of its flowers. This, as well as *T. cistoides*, has some aperient properties ascribed, and is therefore sometimes used medicinally in the countries where it is indigenous. [TRAPA.]—*Eng. Cyc.*

(8278) TRIBULUS AQUATICUS vegetates at Lahore and Cashmere, and affords a considerable revenue, principally to theCashmerean government The waternuts are boiled, and so sold, in bazars. A poultice of Trapa natans is recommended to resolve indolent tumors probably Trapa bispinosa would serve the same ends. *Thirty-five years in the East by Dr. Honig. p.* 359.

(8279) TRIBULUS LANUGIONOSUS.—WOOLLY CALTROPS.

Gokooroo, Gokru, HIND.

Very universal over the ground in Rajwarra. The seeds and capsules are highly mucilaginous. —*Gen. Med. Top. p.* 193. It is a common annual lower with yellow flowers and angular thorny ruit.—*Riddell.*

(8280) TRIBULUS TERRESTRIS. SMALL ALTROPS Lin.

iringie, also Nerringee-keeray, TAM.
ulléroo, TEL.
Gokoroo, DUK.
Khussukee sagheer, ARAB.
Sooduinstra, SANS.

A procumbent annual weed with thorny capules, yellow flowers, leaflets are eaten mixed long with others ; seldom used but in time of carcity.—*Jaffrey. Tribulus terrestris*, is used in ochin China as an astringent, in the South of urope as an aperient and diuretic.—*Eng. Cyc.*

(8281) TRICHILIA, a genus of Plants beonging to the natural order *Meliaceæ*. The pecies are found in the tropical parts of Ameica, and a few in Africa and in Anstra-a. Indian species, *T. spinosa*, is not well nown, but the oil of its seeds is said to be a seful remedy in chronic rheumatism and paralyc affections. Several are possessed of active roperties. Forskal found the fruit of one species the mountains of Yemen used as an emetic, nd called Jouz-al-Cai, or the Emetic Nut, hence he named it Elcagi, now called *T. emetica*. he seeds bruised are used for washing the hair, s well as an application in itch. *T. trifoliata*, native of Curacoa, has an unpleasant smell in l parts, and is said to possess active properties. . *cathartica* is described by Martius as having reat bitterness, and as employed in Brazil as a ure for fevers, &c. *T. moschata* is remarkable in Jamaica for the odour of musk which it diffuses all around, on which account it is called Musk-Wood.

(8282) TRICHILIA EMETICA. ELCAJA, is an Arabian Plant, whose fruit is said to possess emetic properties. Botanists call it *Trichilica Emetica*. Forskahl describes it as a large tree, with villous shoots, pinnated leaves, with entire ovalo-oblong pedicellate leaflets, clustered flowers with 5 greenish-yellow petals, 10 monadelphous stamens, and a downy capsular fruit about an inch long, with 3 valves, 3 angles, and 3 cells, having 2 plano convex seeds in each cell. The tree is said to be called Roka, and to be common on the mountains of Yemen. The fruit is sold at Bei el fakih, for mixing with fragrant materials with which the Arab women wash their hair. The fruit called 'Djous el kai' is reputed an emetic. The ripe seeds mixed with Sesamum oil are formed into an ointment as a cure for the itch.—*Eng. Cyc* Common on the mountains of Yemen and in Senegal. The fruit is used by the Arabs under the name *Djous el kai*, and in powder mixed with oil is employed against the itch.—*O'Shaughnessy, page* 245.

(8283) TRICHILIA SPINOSA. Willd. THORNY TRICHILIA,

Caat Koorundoo, TAM.

From the berry of this thorny plant is prepared a warm oil, which the Native Practitioners consider as a valuable application in chronic rheumatism and paralytic affections.—*Ains. Mat. Med. page* 74.

(8284) TRICHODESMA. Royle states that the species of Trichodesma are deemed diuretic, and are supposed cures for snake bites.—*O'Shaughnessy, page* 467.

(8285) TRICHOSANTHES, a genus of plants belonging to the natural order Cucurbitaceæ. Many of the species are edible, and from the long often sinuous-formed fruit they have been named Snake-Gourds ; the Anguina of some botanists. The fruit of many of the species is eaten in India whilst that of others contains a purgative principle.—*Eng. Cyc. page* 1092.

(8286) TRICHOSANTHES AMARA, St. Domingo, seeds bitter and astringent, sometimes emetic.—*O'Sh. p.* 209.

(8287) TRICHOSANTHES ANGUINA, SNAKE GOURD.

Chichinga,Chichnda HIND.
Poodalungai, TAM.
Chichonda, DUDK.
Potthakaia, TEL.
Petala Ular, MALAY.
Purwar, HINDOOIE.
Pottola, SANS.

This is the produce of a plant of the class Monœcia and order Syngenesia : in shape resembles a long snake and is made into curries and other dishes.—*Ainslie, p.* 243. The Snake Gourd is cultivated by the Natives grown on trellis work, the fruit long and spindle shaped is used chiefly in curries, &c.—*Riddell.* The snake gourd is generally cultivated for its long snake-like fruit used in curries, often used cut into lengths filled with a preparation of minced meat, much liked by East Indians. This is sown in the rains, and grown generally over a high pandall, that the fruit may have space to hang down from; a small stone or weight is then tied to the end to increase its length, which varies from a foot and a half to three feet or more. Raw, it resembles a cucumber in flavour, but is better dressed in a stew or curry.—*Jaffrey.* This curious contorted gourd, peculiar to India, is in very general demand for vegetable curries. The plant is of easy culture on trellises around the doors of the native cabins, and the fruit often grows two feet long, beautifully striped, small, and tapering so that streaming down from the trellis, they immediately remind one of striped snakes suspended from the foliage of trees.—*Mason.*

(8288) TRICHOSANTHES CORDATA.

Boomee koomara.

Found wild near the Megna. The root is tuberous, perennial, growing to the size of a man's head, is used in India as a substitute for Colombo.—*O'Shaughnessy, p.* 550.

(8289) TRICHOSANTHES CUCUMERINA BITTER GOURD.

Junglee chuchinga, BENG.

Found in hedges in Bengal. The fruit is reckoned an anthelmintic. Royle says it is edible (p. 219.)—*O'Shaughnessy, p.* 350.

This is a very bitter gourd of the same genus as the preceding, but unlike that, this is eaten by the natives only.—*Mason.*

(8290) TRICHOSANTHES DIOICA. DIŒCIOUS SNAKE GOURD.

Pulwull, BENG.

An alcoholic extract of the unripe fruit is described as a powerful and safe cathartic in 3 to 5 grain doses, repeated every third hour till the desired effect is produced.—*O.'Sh. p.* 350. Both wild and cultivated in the rains.—*Gen. Med. Top. p.* 209.

(8291) TRICHOSANTHES INCISA. Rottl.

SirrooCorruttie vayr, TAM. | Tsinna Avagooda vayroo, TEL.
Birme kejur, DUK.

This as it appear in the bazars is a light coloured and very bitter tasted root. Pounded small and mixed with Margosa oil it is considered as a valuable remedy applied to those offensive sores which sometimes take place inside of the ears. It is also poured up the nostrils in cases of Ozæna.—*Ains. Mat. Med. p.* 114. —At another place Dr. Ainslie says, the fruit of this species of Trichosanthes, pounded small, and intimately blended with warm Cocoa nut oil, is considered as a very valuable application for cleaning and healing those offensive sores which sometimes take place inside of the ears. The same preparation of it is supposed to be a useful remedy poured up the nostrils, in cases of *Ozæna.—Anis. Met. Med. p* 77. The taste of the rind being singularly bitter, many experiments were made with the view to ascertain whether it posesses purgative, tonic, or aperient properties In three grain doses, thrice daily, it produced no sensible effect.—*O' Shaughnessy, p.* 349.

(8292) TRICHOSANTHES VILLOSA, Java, fruit acts like colocynth.—*O' Sh. p.* 350.

(8293) TRIDACNA. Animal oval, cordiform, having the lobes of the mantle united nearly throughout the circumference: three apertures; two posterior and inferior for the anus and for respiration, the third anterior, corresponding with the gape of the lunule, and giving passage to a thick, cylindrical, and byssiferous foot, in nearly all the species. Mouth oval, furnished with great lips, at the extremity of which are two pairs of pointed labial palps. (Deshayes). Shell regular, equivalve, inequilateral, transverse; with a gaping lunule. Hinge with two compressed, unequal anterior, and intrant teeth. Ligament marginal, external. (Lamarck.)

(8294) TRIDACNIDÆ, a family of Conchiferous *Mollusca* comprising the genera *Tridacna* and *Hippopus.—Eng. Cyc.*

(8295) TRIDACNA GIGAS.—Shell very large, transversely oval, with great imbricato squamous ribs, the scales short, arched, and lying near together; the interstices of the ribs are not striated. The size and weight of this immense bivalve, the largest and heaviest known, combined with the beautiful marble-like appearance and whiteness of the inside of the valves, have always caused it to be sought for as an ornament for grotto-work or for garden-fountains; and, indeed, the value of a large individual forms a very picturesque basin for catching the clear falling water and transmitting it through the deep interstices of its indented edge to the reservoir below. Wolfart's fossils were not improbably the relics of some ancient and long-neglected pleasure ground. The specimen whose valves serve for holy-water vessels (Benitiers) in the church of Saint Sulpice was presented to Francis I. by the republic of Venice; and Lamarck observes that, large as these are, still larger have been known. This species can hardly have been the *Tridacna* of Pliny ('Nat. Hist.,' xxxii. 6), which was probably only some overgrown European oyster that required three bites. A fine well-fed Indian giant *Tridacna* would furnish forth a dish for a dozen. But it is not improbable that the *Pedalia* or oysters a foot long, from the Indian Sea, noticed in the preceding sentence of the same book and chapter, may have been *Tridacnæ* of modern authors. The figure of *T. gigas* given in the

‘ Zoology of the Astrolabe’ was designed at Carteret Harbour, New Ireland. The native brought many very large individuals, whose flesh was abandoned to them, and which they ate raw. The naturalists of the expedition found the species again at Tongataboo, at the Moluccas, at Timor, and at Wagion. It appeared always to inhabit ather shallow water. Some fine specimens are to be seen in the Garden of the Zoological Society, Regent's Park.

(8296) TRIDACNA HIPPOPUS (*Chama lippopus*, Linn. ; *Hippopus maculatus* Lam. ; *Tridacna maculata*, Quoy, ‘ Voyage of the Asrolabe.’) This well-known but beautiful species, iow much used in the ornamental arts for inkstands, &c., has a transversely ovate shell, which s of moderate size, ventricose, ribbed, subsquanous, and white spotted with red or purple ; the unule is heart-shaped and oblique. The naturalsts of the ‘ Voyage of the Astrolabe’ found this pecies at Carteret Harbour, New Ireland, and lso at Vanikero, where they collected specimens eft dry on the reefs.—*Eng. Cyc.*

(8297) TRIFOLIUM (τρίφυλλον), a genus of lants belonging to the natural order *Leguminosæ.* his genus, which has obtained its Latin as well s its French and English designations, Trefle nd Trefoil, from its leaves possessing three segients, is one of the most extensive in the vegeable kingdom. The calyx is tubular, 5-cleft ; orolla remaining after decay ; carina obtuse ; tamens diadelphous, more or less connate with he petals, the filaments dilated above ; the style mooth ; legume ovate, with one or two seeds, ometimes oblong, with three or four seeds, and ncluded within the decaying calyx and corolla. ll the species are herbs. The leaves are mostly ivided into three segments or foliolules ; somemes they are seen with four or five. The flowers re disposed in dense heads or spikes, and are of purple white or cream-colour. De Candolle has rranged the numerous species of this genus under even sections : the characters of which are foundl principally on the inflorescence and on the orm of the calyx, or the corolla combined with . We shall here select some of the most useful nd remarkable of the species as illustrations of e genus.

(8298) TRIFOLIUM ALEXANDRINUM, LEXANDRIAN TREFOIL, OR CLOVER, is a native Egypt, about Alexandria. It is the only refoil that is cultivated in Egypt, where it is tensively used as fodder for cattle.

(8299) TRIFOLIUM ARVENSE, Hare's oot Trefoil. The stem erect, branched, or sime ; heads of flowers very hairy, soft, nearly lindrical, terminal, stalked ; the teeth of the lyx longer than the corolla, setaceous, and somehat spreading ; stipules ovato-acuminate ; leafts lanceolate, obtuse. This plant is a native Europe, and is abundant in cornfields and dry astures in Great Britain. Its soft hairy subcylindrical heads or spikes give it a very remarkable character.

(8300) TRIFOLIUM INCARNATUM, Flesh Coloured Trefoil, or Scarlet Clover. The spikes of flowers are at first ovate, at length cylindrical, solitary, and naked at the base the calyx 10-nerved and hairy, with unequal awl shaped acute teeth, longer the tube and shorter than the corolla ; stipules ovate and obtuse ; leaflets obovate, crenated, villous ; stem erect. The species is a native of the south of Europe, in damp meadows.

(8301) TRIFOLIUM INDICUM. INDIAN TREFOIL.

Bun-mether ; Jhoonjoorie ; Goolabe, HIND.

Very common in Ajmeer, Marwar and Jaipoor. Camels are fond of it ; other cattle do not eat it. —*Genl. Med. Top. p.* 205.

(8302) TRIFOLIUM MARITIMUM, Sea-Side or Teasel-Headed Trefoil. The heads are sessile and terminal ; the teeth of the calyx broad acuminate, rigid, the lower one much longer than the rest, shorter than the claws of the petals, all of them at length enlarged and spreading ; stipules lanceolate, stipulate, leaflets oblongo-obovate, stem ascending. It is a native of Europe, in salt marshes and meadows near the seaside. It is found on the east and the south of Britain.—*Eng. Cyc.*

(8303) TRIFOLIUM MEDIUM, MEADOW-TREFOIL, Marl-Clover or Cow-Grass. The heads of the flower are lax, subglobose, solitary, terminal ; the teeth of the calyx are setaceous the lower one longer than the rest, about equal to the tube of the corolla ; stipules lanceolate, acuminate, leaflets elliptical ; stems branched, zigzag. It is a frequent plant in the pastures of Britain, where it can be recognised by its zigzag stem, from which circumstance it is sometimes called zigzag Trefoil.

(8304) TRIFOLIUM PRATENSE Common purple-Trefoil, or Red-clover. The stem is ascending, the leaflets are oval or obcordate ; the heads of flowers dense and ovate ; the teeth of the calyx are setaceous, the lower one longer than the rest, stipules ovate bristle-pointed. This plant has reddish-purple flowers, and is frequent in meadows and parterres, where it blooms all through the summer. The leaves are usually marked with a white subsagittate mark in the centre.

(8305) TRIFOLIUM REPENS. White-or Dutch Clover. It has umbellate globose heads ; legumes with four seeds ; teeth of the calyx unequal the leaflets obcordate, serrulate, the stem creeping. This plant is said to be the Shamrock of Ireland, and is worn by the Irish as the badge of their country. The original Shamrock does not appear to have been a clover, but the Oxalis acetosella, which has also leaves with three divisions. Leaves of this character have, from a very remote period, been regarded with superstitious reverence.

"The holy trefoils charm"

was supposed to be very "noisome to witches," and to keep those who wore it from the influences of evil spirits of all kinds.. *Trifolium Suffocatum*, *Trifolium Glomeratum*, *Trifolium Subterraneum*, *Trifolium frugiferum*, all are British species.—*Eng. Cyc.*

(8306) TRIGLA, a genus of Acanthopterygious Fishes, popularly known as Gurnards, and belonging to the family *Loricati* in the arrangement of Cuvier. The head of *Trigla* is mailed and angular; the opercle and shoulder-bones armed with spines; the body is scaly; there are two distinct dorsal fins; beneath the pectorals are three detached rays the branchiostegous membrane has seven rays; both jaws and the front of the vomer are armed with fine velvety teeth. The Gurnards are fishes always remarkable for singularity of form, and often for brilliancy of colouring. They derive their popular appellation from a grunting noise which they make when taken out of the water. In the British seas the commonest species are the Gray Gurnard (*Trigla Gurnardus*), a silvery gray fish more or less clouded with brown and speckled with black; the Red Gurnard (*Trigla Pini*), of a bright rose-red colour; and the Sapphirine Gurnard (*Trigla Hirundo*), a large and handsome fish remarkable for the vivid green and blue hues of the inner surface of its large pectoral fins. The two last are most abundant on the western coast. Several other rarer species are also inhabitants of the British seas. There are some beautiful small species in the Mediterranean where also lives the Flying-Gurnard (Dactylopterus volitans), which differs generically from Trigla in having the fine rays of the pectorals connected by membranes, by means of which the fish is enabled to support itself for some time in the air in the manner of the flying-fish. It is a handsome species, above a foot long. Another Flying-Gurnard (Dactylopterus orientalis) lives in the Indian ocean.—*Eng. Cyc.*

(8307) TRIGONELLA (from Τρεῖς, three and γωνῖα, an angle) a genus of Plants belonging to the natural order Leguminosæ. It consists of strong scented herbs with trifoliate leaves; the calyx is 5-parted and 5-toothed; the keel of the corolla is obtuse; the stamens are diadelphous; the style is smooth; the fruit a legume; unilocular, compressed, linear and containing six or more seeds. The known species of this genus are upwards of thirty. Only five of them are European, and only one is found in Great Britain.—*Eng. Cyc.*

(8308) TRIGONELLA CORNICULATA, is given by Dr. Wight, in Icones.

(8309) TRIGONELLA FÆNUM-GRÆCUM, The common Fenugreek, has the stem erect simple; the leaflets obovate, slightly toothed; the stipules lanceolate, falcate, entire, the calyx hairy, the teeth awl-shaped, of the length of the tube; the legume is falcate, many seeded; the seeds large, ovate, wrinkled from dots; radicle of cotyledons, prominent. This plant is a native of the south of Europe. Dr. Sibthorp found it in abundance on the shores of Asia Minor. This plant or one of the genus was known to the Greeks under the name, Πδνοῦρον, and to the Romans as Fænum—Græcum, Greek Hay and the seed was held in great esteem as a medicine. The scent of the seeds is very strong and it was undoubtedly this circumstance that recommended them to notice as medicinal agents. —*Eng. Cyc.*

The seed.

Shemlit, Pers.
Metha and Moothe, Duk. Hind, Sans.
Helbh, Arab.
Metheeshak, Beng.
Vendee-kerray, Tam.

This plant is a native of the South of Europe, and cultivated in Asia Minor and in India.

Mucilage, starch, fixed oil, and colouring matter, constitute the greater part of this seed; it is used by the native practitioners in dysenteric affections, and the Arabs employ it in poultices and fomentations. (*Ainslie.*)—*O'Shaughnessy, p.* 291. It is cultivated for a pot herb, considered very wholesome, imparts a very strong odour and taste to curries, the seeds are said to be slightly tonic.

(8310) TRIOSTEUM HIMALAYANUM. Has been discovered by Dr. Wallich's people at Gossainthan in Nepal.—*O'Shaughnessy, page* 377.

(8311) TRIOSTEUM PERFOLIATUM. United States; called 'fever root,' and 'wild ipecacuan.' "The bark of the root is emetic and purgative, leaves diaphoretic, their efficacy impaired by age; they should be preserved in closely stopped jars, and changed annually."—*Lindley Fl. Med. p.* 445.)

(8312) TRIPHASIA. A genus of Plants belonging to the natural order *Aurantiaceæ* of which the species are found in the East Indies, Cochin-China, and China. The calyx is 3-cleft; petals 3; stamens 6, rarely 5-8; filaments awl-shaped, flat; anthers cordate, oblong; fruit baccate, 1-3-celled; seeds 1 in each cell. The species form thorny shrubs with simple or trifoliate leaves. The fruit of *T. trifoliata* is acid in taste, something like the orange, and is both preserved and eaten as a fruit.—*Eng. Cyc.*

(8313) TRIPHASIA TRIFOLIATA, Three-Leaved Triphasia. The three-leaved triphasia which bears a small berry like an orange in minature, often found in Chinese preserves, is raised in European Gardens.—*Mason.*

(8314) TRIPOLI. A Mineral, occurring massive, with a coarse dull earthy fracture. It is meagre and rough to the touch, and yields readily to the nail. Colour, various shades of gray, yellow, and red. It imbibes water, which softens it; when burned it becomes white and is hardened ; it is very difficult of fusion. It was first brought from Tripoli in Africa, but has since been found in France, Italy, and Germany. It is employed in polishing metals, marble, glass, &c. It consists of silica, alumina, and oxide of iron.

(8315) TRIPTOLOMEA. A genus of Plants belonging to the natural order *Fabaceæ*, or *Leguminosæ*, and to the sub-order *Papilionaceæ*. The species are natives of warm climates, and yield the Rose-Wood of commerce.—*Eng Cyc.*

(8316) TRITICUM, a genus of Plants yielding the various kinds of wheat, and belonging to the natural order *Graminaceæ*. It derives its name, according to Varro, from "tritum," ground or rubbed, because the fruit in its preparation as a food for man undergoes the process of grinding or trituration. The various kinds of wheat have been known from a very early period, and mention is made of wheat as a food in the earliest records of the history of man. Both the Egyptians and Jews made use of wheat as an article of diet, and this food is early mentioned in the Bible. It was also used by the Greeks and Romans, and Theophrastus and Pliny make frequent mention of it. On account of the early cultivation of many of the kinds of wheat as articles of diet, it is impossible to tell where the most common species are really indigenous. All the species of *Triticum* are however found most abundantly in temperate climates, and there take the place of the oods used in the hotter parts of the world. Wheat is in northern climates what rice and maize are in warmer ones. The part of the plant of *Triticum* which yields so large a proportion of he food of man is the fruit, seeds, or grain. This fruit, although small in itself, generally orms a large proportion of the plant. When the fruit is ground, the testa, or seed-coat, is separated from what is called the flour. This lour consists of the powdered albumen and mbryo of the seeds. The proximate vegetable principles which this flour contains are starch and gluten. The starch is a highly carbonized vegetable principle, whilst the gluten is characterised by possessing nitrogen. Foods that contain carbonaceous matters are attening, whilst those that contain nitrogen are strengthening. It is thus that wheat-flour has become to be the staple article of diet of the finest races of men in the world. The other cereal grasses contain the same principles, but the gluten or azotised principle is not in so large a quantity as in wheat, as the following analysis of 100 parts of the organic matter of wheat, rice, and barley will show :

	Starch.	Gluten.
Wheat... ...	70.00	23.00
Rice	85.07	3.60
Barley... ...	79.00	16-00

The starch is often separated from the gluten and used for various purposes in domestic economy. [STARCH.] Gluten is identical with Fibrine, and is a form of Protein. [PROTEIN.] The straw of wheat, and the chaff, or the culm, and the flowers, also contains 79 per cent. of organic matter. This consists principally of unazotised vegetable matter, and may therefore be used as an article of diet for cattle. The culms of wheat are also used for the purpose of making plait from which straw hats and bonnets are made, a manufacture of considerable importance in some parts of Europe. The genus *Triticum* is known by possessing solitary spikelets, with the glumes 2-valved and many-flowered ; the valves carinate, acute, or mucronate; the paleæ 2-valved ; the valves lanceolate, the external one acuminate, the internal one bifid at the extremity. The genus consists of about 40 species ; of these 16 are European, and only 5 are natives of Britain. The species are divided into two groups—the *Cerealia*, yielding edible fruits ; and the *Agropyra*, which are merely grasses. The latter group is by some writers, as Beauvois and Lindley, made into a distinct genus. It includes all the species that are natives of Great Britain. The *Cerealia* are known by their spikelets being more or less ventricose and turgid, and the valves are ovate or oblong. These are again divided into the *Frumenta*, or True Wheats, in which the seeds fall out from the chaff ; and the *Speltæ*, or Spelts, in which the seeds remain attached to the chaff. The most important species belonging to the former division are the following :—

(8317) TRITICUM ÆSTIVUM. WHEAT.

Godumbay arisee, TAM.
Gehoon, DUK.
Gendoom, MALAY.
Gawn, GUZ.
Godoomaloo, TEL.

(8318) TRITICUM DURUM. True Beard-Wheat, has the prominent carinæ of the last wheat, with the valves ventricose, oblong, and three times longer than broad. It is a native of Switzerland. It has several varieties, all of which produce summer wheats, and are better known in Italy, Sicily, and Spain than in this country.

(8319) TRITICUM JUNCEUM, Sea Rushy Wheat-Grass, *T caninum*, Bearded Wheat-Grass, and *T. cristatum*, Crested Wheat-Grass, are other species of the *Agropyra.* (Metzger, *Die Getreidearten und Wiesengraser in Botanischer und Okonomischer Hinsicht*, 1841 ; Koch, *Flora Germanica* ; *Cyclopædia of Plants* ; Sinclair, *Hortus Woburnensis* ; Pouchet, *Traite de Botanique* ; Babington *Manual.*)—*Eng. Cyc.*

(8320) TRITICUM POLONICUM, Polish Wheat, has the spike irregularly 4-cornered or compressed ; the spikelets 3-flowered ; the valves subventricose, oblongo-lanceolate, herbaceous, with many nerves. It is found native in some parts of Europe, not however in the country which gives it its name. In cultivation it yields summer wheats, which are adapted for warmer climates than Great Britain.

The Spelts include the following species :—*T. spelta*, Spelt-Wheat ; *T. dicoccum*, Two-Grained, or Rice-Wheat ; and *T. monococcum*, One Grained Wheat.

The *Agropyra* do not possess ventricose-turgid spikelets, and the valves are lanceolate or linear-oblong. This division includes the wheat-grasses, some of which are only known as troublesome weeds. The most remarkable instance of this is *T. repens*, Creeping Wheat-Grass Couch-Grass, or Spear Grass. The difficulty of getting rid of its creeping underground stem, the smallest portion of which if left in the ground sends up fresh buds, is the cause of this plant being so great a pest to the farmer. The *T. maritimum*, a native of sea-coasts, seems to be only a variety of this plant.

(8321) TRITICUM SATIVUM. Wheat.

Gahoon Gioon, Gom, Beng. Hind.

This is now cultivated, with success in many parts of our Indian dominions.—*Ainslie.* Two sorts of this are grown in Mysore. They are called Hot-te Godhi and Jeve Godhi. The difference between them is that the latter is covered with husks like paddy ; and the former is without them. Jeve Godhi is only grown in the lands bordering on the Pennar, and the gardens in the Bangalore Division. The Hot-te Godhi is largely cultivated in dry lands in the Chittledroog Division, and the vicinity of Hurrihur. This is the wheat usually employed for making European bread. It is exported to the Neilgherries, and its usual price at Bangalore is a Rupee for ? seers.

(8322) TRITICUM TURGIDUM, Turgid, Cone, or English Wheat, is known principally by its prominent carinæ. About 10 varieties of this species are known to agriculturists, half of which are summer and half winter wheats. Of these the Clock, Great or Revel Wheat, and the Russian, or Blue English Wheat, are the best.

(8323) TRITICUM VULGARE, Common Wheat, has a 4-cornered imbricated spike with 4-flowered spikelets, the valves ventricose, ovate, truncate, mucronate, compressed under the apex, the nerve somewhat prominent. This species includes the *T. æstivum* and *T. hybernum* of many botanists. They appear however to be only varieties of this species, differing in their periods of growth. The native country of this species is not well ascertained : it has been found wild in some districts of Persia, also of Siberia, apparently removed from the influence of cultivation. The *T. hybernum* is the Lammas, or Winter-Wheat, and embraces by far the greater number of varieties which are cultivated as the food of man. The wheats known in Great Britain and on the Continent as Fox, Kentish, Talavera, Bohemian or Velvet, Red, White, and Red-Eared Bearded Wheats, are varieties of *T. hybernum.*

(8324) TRIUMFETTA ANGULATA. See Wight's Icones p. 320.

(8325) TRIUMFETTA LOBATA.

Phetwoon, Burm.

This *Fibrous Plant* is annual and grows to a height of five or six feet, presents a small yellow flower in December, consisting of five petals, and in February presents a small round capsule covered with stiff bristles.—*McClelland.*

(8326) TROCHIDÆ, a family of Turbinated Gasteropodous *Mollusca.* The genus *Trochus* of Linnæus was placed by him between *Murex.* and *Turbo,* in his last edition of the 'Systema Naturæ,' and comprized 26 species. M. De Blainville observes that all the species of this family are phytiphagous, marine, and live upon the rocks on the shore of the sea. He divides the group into *Solarium* and *Trochus.*

(8327) *Solarium.*—Animal unknown. Shell orbicular, rolled up (enroulee) nearly on the same plane, or planorbic; spire very much lowered (surbaissee); a large conic umbilicus, with its edges denticulated or not at the entrance; aperture not modified by the last whorl of the spire, which is entirely flat; no columella. Operculum unknown (Blainville). The number of recent species recorded by Woodward is 25, and of fossil 56. The species of this genus hitherto found have occurred in the seas of the warmer climates. The Mediterranean, the Indian Ocean, the coasts of Tranquebar, the South Seas, and those of Australia are the localities recorded by Lamarck. The specimens have been found near the shore—it seems to be a littoral genus—on rocks and weeds.

(8328) *Solarium perspectivum.* Shell orbiculate-conoid, longitudinally-striated, whitish-yellow, with articulated belts of white and brown or chestnut near the sutures ; the notches of the umbilicus small. (Lamarck.) Animal with a large foot widened in front, and having a very strongly developed marginal furrow, yellowish on the sides, marked with a black stria above. The head presenting a large escutcheon. The tentacles short, stout, and marked with two longitudinal black bands on the sides. At their base are placed the eyes on very short pedicles. The branchial cavity appeared to be partially divided in two, lengthwise, by a sort of fold. The intestine describes two rather considerable circumvolutions before it passes the liver. Operculum large, oval, membranous, and strongly but sparingly spiral at one of its extremities. The colour is yellowish, like that of the whole animal. Messrs. Quoy and Gaimard, who have given this description of the animal in the 'Zoologie' of the Astrolabe, state that they know nothing of the habits of the species, which was brought to them nearly dead by a Malay of Amboyna.

(8329) *Trochus.*—Animal well known, and as characterised above. Shell thick, ordinarily nacreous, trachoid, with the spire sometimes lowered (surbaissee), and at others rather lofty (elancee) and pointed at the summit; trenchant or carinated on its circumference, umbilicated or not; aperture depressed, angular or subangular, with disunited borders, the right lip trenchant; the columella bent, twisted, and often projecting in front. The number of recent species of *Trochus* given by Woodward is 150, and fossil forms 360. The fossil forms are found in the Devonian rocks.

(8330) *Trochus obeliscus.* Shell conico-pyramidal, nodulous and granulous, coloured with green and white; the whorls tuberculato-nodose, and girt with many granose circles; the last whorl, as it were, removed or taken away (dempto); the lower surface planulate; the lip sinuated at the base. Lamarck gives the Indian Ocean as the habitat of his species. Messrs. Quoy and Gaimard, who captured the individual above described at Tonga, remark that in colour it is *T. obeliscus*, but that it tends to *T. acutus* in its suddenly-pointed spire. Dr. J. E. Gray makes the *Trochidæ* the second family of his *Podophthalma*, the first section of the order *Phytophaga* in his arrangement. The *Trochidæ* are immediately preceded by the *Turbinidæ* and followed by the *Stomatellidæ*. Dr. Gray's *Trochidæ* consist of the genera *Pyramis*, *Cardinalia*, *Trochus*, *Polydonta*, *Clangulus*, *Phorcus* (*Phorus*?) *Ziziphinus*, *Canthiridus* (*Cantharidus*?) *Thalotia*, *Monodonta*, *Gibbium*, *Gibbula*, *Rotella*, *Livona*, *Talopia*, *Cumitia*, and *Delphinula*. ('Synopsis Brit Mus., 1840.) In Woodward's 'Manual,' *Solarium* is referred to *Chitonidæ*, and *Trochus* to *Turbinidæ*.—*Eng Cyc.*

(8331) TROGON (APALODERMA) REINWARDTII, Temm., is a native of Java and Sumatra, where it was discovered by Professor Reinwardt, whose name it bears. This, Mr. Gould observes, is a scarce bird in cabinets of natural history; and he attributes its rarity to its being very local, remarking that the vast collections brought to this country by Sir T. Stamford Raffles and Dr. Horsfield did not contain an example.—*Eng. Cyc.*

(8332) TROGONIDÆ, a family of Insessorial or Perching Birds, remarkable for the beauty of their plumage. Mr. Gould's splendid 'Monograph of the Trogonidæ' was finished in 1838; and in the 'Introduction' to that work he observes, that those birds, as their general structure and their habits sufficiently indicate, belong to the fissirostral tribe of the *Insessores*. "Greatly insectivorous," says Mr. Gould, "they seize the flitting insect on the wing, which their wide gape enables them to do with facility; while their feeble tarsi and feet are such as to qualify them merely for resting on the branches, as a post of observation whence to mark their prey as it passes, and to which, having given chase, to return. As in all other groups, however, we shall find modifications of the type constituting the ground of generic or subgeneric divisions... If not strictly elegant in form, the Trogons in the brilliancy of their plumage are surpassed only by the *Trochilidæ*: their splendour amply compensates for every other defect. Denizens of the intertropical regions of the Old and New World, they shroud their glories in the deep and gloomy recesses of the forest, avoiding the light of day and the observation of man: dazzled by the brightness of the meridional sun, morning and evening twilight is the season of their activity." The Trogons are described as solitary birds, extremely jealous of their freedom, never frequenting inhabited or open tracts, and delighting in the silence of deserts. "The interior of the thickest forests is their chosen abode for the entire year. They are sometimes seen on the summit of trees; but in general they prefer the centre, where they remain a portion of the day without descending to the ground, or even to the lower branches. Here they lie in ambush for the insects which pass within reach, and seize them with address and dexterity. Their flight is lively, short, vertical, and undulating. Though they thus conceal themselves in the thick foliage, it is not through distrust; for when they are in an open space, they may be approached so nearly as to be struck. They are rarely heard to utter any cries, except during the season of reproduction, and then their voice is strong, sonorous, monotonous, and melancholy. They have many cries, from the sound of one of which their name is derived. All those whose habits are known nestle in the hollows of worm-eaten trees, which they enlarge with their bills so as to form a comfortable and roomy residence. The number of eggs is from two to four and the young are born totally naked, but their feathers begin to start two or three days after their birth. The occupation of the male during incubation consists in watching for the safety of his companion, bringing her food, and amusing her with a song, which, though we should call it insipid, is to her without doubt the expression of sensibility. Some of the Couroucous express the syllable 'pio,' repeated many times in succession with a powerful yet plaintive tone. Their accent almost reminds one of the wailings of a child who has lost its way, and it is thus that they cry to each other amidst the silence of the forests. As soon as the young are able to provide for themselves, they separate from their parents to enjoy that solitude and isolation which appear to constitute the supreme happiness of the species. Their aliments are composed of larvæ, small worms, caterpillars, coleoptera, and berries, which they swallow entire. The male, at various ages, the female, and the young differ in their plumage, which has given rise to the institution of more species than are really in existence." (Griffiths, 'Cuvier's Animal Kingdom.') With regard to the geographical distribution of the Trogons, Mr. Gould says that they appear, on general survey, to be divided between America, including its islands, and the islands of the Indian Archipelago; two or three species only having yet been discovered on the continent of India, and those principally inhabiting the countries bordering the Indian Seas. The great nurseries for these birds in the Old World are, he observes, the islands of Ceylon, Sumatra, Java, Borneo. &c.; while over the whole continent of Africa only a single species has yet been discovered. The total number of species known when Mr. Gould finished his monograph was 34, 23 of which are inhabitants of America and its islands, 10 of the Indian Islands and India and one of Africa; but he states in the preface that he has reason to believe that many will yet be discovered, both in the Old and New World particularly in those remote regions which civilised man has seldom, if ever, visited.—*Eng. Cyc.*

(8333) TROLLIUS, a genus of Plants belonging to the natural order *Ranunculaceæ*. It has a calyx of 5 or more coloured sepals, 5 or more small petals, which are linear, with an obscure depression above the contracted base; the capsules, or follicles, are numerous, and filled with obovate-angular polished seeds. The species are perennial; they are not numerous, and are found generally in the temperate parts of the world.

(8334) TROLLIUS EUROPÆUS, European or Mountain Globe-Flower, has 10 to 15 sepals involuted in the form of a globe; the petals the same length as the sepals, or a little shorter; the leaves 5-parted with the divisions cut and serrated. The plant is diffused throughout the north of Europe, in moist pastures in sub-alpine districts. It is abundant in the whole chain of the Alps, and is also found in mountainous districts in the north of England, Ireland, Wales, and Scotland. The flowers are large and handsome: in Scotland they are called Luckengowans, or Cabbage Daisies. In some parts of England as well as on the continent of Europe, they are gathered on festive occasions for making garlands and decorating the cottages of the peasantry. There are two species, *T. Asiaticus* and *T. Americanus*, which are found in Asia and America,

(8335) TROPÆOLACEÆ, *Indian Cresses*, a natural order of Plants. The plants belonging to this order are smooth, tender, and herbaceous with diffuse or twining stems, and alternate petiolate peltate leaves; the flowers are irregular, axillary, and solitary; the calyx has 5 sepals, the upper one with a long distinct spur; the petals are unequal and irregular the two upper are sessile and remote, arising from the throat of the calyx, the three lower stalked, and smaller, sometimes abortive; the stamens, 8 in number, perigynous, the filaments distinct; the anthers minute, erect, 2-celled, dehiscing longitudinally: ovary consisting of 3 carpels; style 1 stigmas 3, acute; ovules solitary, pendulous the fruit is indehiscent, separating into three pieces which surround a common axis; the seeds are large, having no albumen, and filled with the embryo, the cotyledons of which are thick and consolidated together into a single body; the radicle lies within the projections of the cotyledons. The species of this order differ from *Balsaminaceæ* in their more regular flowers, and in the juicy fruit not having a bony lining to the cells. They resemble *Geraniaceæ* in the possession of a spur. The genera belonging to this order are *Tropæolum*, *Magallana*, and *Chymocarpus*, all of them natives of South America.

(8336) TROPÆOLUM. This flower is very common—the colours are yellow, light yellow and deep orange; and as the plant is a creeper, it is well adapted for trellis work. The leaves are eaten with sallad, and the seed when green sometimes pickled. Is propagated by slips or seeds, in any good soil.—*Riddell.* Tropæolum is (from τρόπαιον), a genus of Plants, the type of the order *Tropæolaceæ*. It has a 5-parted calyx the upper lobe being furnished with a spur 5 petals, unequal, the three lower ones smaller or altogether absent; 8 stamens, free from the base; 3 carpels, some what erose, kidney-shaped indehiscent, furrowed, roundish; the seed large filling the cell. The species of this genus, which derives its name from the petiole being inserted into the centre of the leaf, giving it the form of a buckler, are all of them inhabitants of South America. They are all climbing plants.—*Eng. Cyc.*

(8337) TROPÆOLUM ADUNCUM, Hooked Indian Cress or Nasturtium, is a native of both Mexico and Peru.

(8338) TROPÆOLUM AZUREUM, Purple Indian Cress or Nasturtium, has the leaves 5-parted, with linear unequal laciniæ; equal entire bilobed petals, much longer than the calyx, with a spur shorter than the petals This plant was discovered by Mr. Miers, and first described in his 'Travels in Chili' and had been previously seen by Mr. Bridges on the Carycan de Quillota, 4000 feet above the surface of the sea. It is remarkable for its blue flowers.—*Eng. Cyc.*

(8339) TROPÆOLUM MAJUS. Great Indian Cress or Nasturtium, has the leaves peltate, nerved, orbicular, somewhat 5-lobed nerves not mucronate; petals obtuse. This plant is also a native of Peru. It was introduced into England, according to Peter Collinson, says Smith, in the year 1616. It has much larger flowers than the preceding, but having the same colour and general appearance. The fruit of this, when green, like the preceding species, is made into a pickle, for which its warm biting character renders it very fit.—*Eng. Cyc.*

(8340) TROPÆOLUM MINUS, Small Indian Cress or Nasturtium has peltate-nerved rbicular leaves, the nerves mucronate at the pex; the petals each ending in a bristle-like oint. This plant is a native of Peru. It is ne of the species of the genus that was earliest rought to Europe, and was cultivated in England by Gerarde. It has deep yellow flowers treaked with orange and red. The whole plant ossesses an acrid flavour and odour which are eculiar to this order and the *Cruciferæ*. It is n this account that all the species of *Trapæolum* ave obtained the common name of *Nasturtium*, hich is the name of a genus of plants belonging to *Cruciferæ*. The fruit of this plant is picked, and eaten in the same way as capers; the lowers and leaves may also be eaten as a salad. here is a variety in gardens with double lowers.—*Eng. Cyc.*

(8341) TROPÆOLUM PENTAPHYL-UM, Five-Leaved Indian Cress or Nasturtium, as 5 leaflets which are ovate or ovato-lanceoate, entire, and stalked; only 2 petals, which re sessile, acute, quite entire, shorter than the alyx. It is a native of Buenos Ayres, Monte ideo, and Brazil in the province of Cisplatine. —*Eng. Cyc.*

(8342) TROPÆOLUM TRICOLORUM, he Tricolor Indian Cress or Nasturtium, is a ative of Chili at Coquimbo. It has a calyx of n orange-scarlet colour, and tipped with black, hilst the petals are yellow. It is the most howy and handsome of the species.—*Eng. Cyc.*

(8343) TROPÆUM, Mr. Sowerby's name for genus of *Ammonites*, apparently identical with *rioceratites*, and consisting of those species hich have their whorls disconnected, such as *rioceratites Duvallii.*

(8344) TROPHIS, (from τρέφω,) a small genus f Plants belonging to the natural order *Artoarpeæ*. The species are found both in the East and West Indies. The flowers are diœcious; spike lax, axillary; male, perigone 3 eaved, spreading, stamens 4; female, perigone -leaved; ovary ovate, 1-celled, 1-seeded; stigna bifid. The species form milky trees with lternate entire leaves.

(8345) TROPHIS AMERICANA, the Raoon-tree, is 23 feet high, and a native of the Vest India Islands, where the leaves and twigs nake a wholesome fodder for cattle in the inland voody parts of Jamaica. The drupes are about he size of grapes, and have a pleasant flavour.

(8346) TROPHIS ASPERA, is a native of nd common in all parts of India, sometimes hrubby, but it also grows into a small crooked ree. its leaves are oblong, unequally serrate, nd so scabrous as to be employed by the natives n polishing ivory. The berries are greedily aten by birds.

(8347) TROPHIS SPINOSA, another Indian pecies, less common, is thorny; leaves oblong lanceolate, grossly serrate towards the apex, smooth; female calyx twice the length of the ovary, and eaten by the natives in their curries. —*Eng. Cyc.*

(8348) TROWSER CHECK, is chiefly manufactured in the district of Cuddalore and in the out skirts of Madras, they are of various kinds.

(8349) TRUBU. This is the name of a fish, the scientific appellation of which Crawfurd had not ascertained, but of which the salted and dried roes form a very considerable article of trade in the western parts of the Malayan Archipelago. It seems to be local, and like salmon and some other fish, to frequent rivers for the purpose of spawning. Its favourite resort is the muddy eastern coast of Sumatra, and more especially the narrow strait which divides Bancalis and some other low islands from the main land, and into which the river of Siak disembogues. At a place called Bukit-batu (rock-hill), a considerable fishery of the trubu is carried on, which is thus noticed by Mr. Anderson:—"The river of Bukit-batu is a very small stream, close to the mouth of which stands the town of Bukit-batu, which is a place of considerable trade the grand staple being roes of the trobo-fish, or telur-trobo (trubu, roes, or eggs), as they are called. There there is a very extensive fishery, and three or four hundred boats, with two and three men in each, often go out at a time to the fishery, which is outside the straits of Tanjung-Jati." (Teak tree promontory.)—Anderson's mission, p. 335. The fishery of the trubu is of immemorial antiquity, and is referred to by De Barros as existing on the arrival of the Portuguese just as it does at present." "The rivers" (of Sumatra), says he "contain a great variety of fish, and in some of them, such as that of Siaca (Siak) they catch small shads (saves) of which the people of the country use the roes only, and of these they have a greater abundance than we have of the fish themselves." Decade 3, Book 5, chap. 1.—*Crawfurd Dictionary, page* 440.

(8350) TRUFFLE. A delicate fungus (*Tuber Cibarium*), esteemed a great deli-cacy. They are procured in France, Italy and other countries.—*Faulkner.*

(8351) TRUMPET FLOWER. VIDE BIGNONIA.

(8352) TUBERACEÆ, a section of the sub-order *Gasteromycetes*, of the natural order *Fungi*. It is known by its sporangia being membranaceous, and scattered on a serpentine vein-like hymenium, and included in a concrete uterus. The sporidia are at first pulpy. This section includes the genus *Tuber*, the Common Truffle, and *Rhizopogon*, the White Truffle. The species of these genera are not numerous, and are found very generally diffused throughout the temperate parts of the world, and growing buried beneath the soil. The genus *Tuber* has a closed uterus marbled internally with veins; the sporangia are pedicillate, and confined to the veins.—*Eng. Cyc.*

(8353) TUBER CIBARIUM, the Common Truffle, is known by its surface being warty and of a black colour. It is found buried in the soil of woods, especially beech-woods, sometimes at the depth of ten or twelve inches or more. It is a native of Europe, and is also found in Japan and the East Indies. It grows abundantly in some parts of England. This is one of the few species of the natural order *Fungi* that is used as an article of diet. For this purpose they appear to have been used by the Greeks and Romans; the latter especially considered them a delicacy. It may be however a question as to whether the Roman 'tuber' is really the common truffle. There can, however, be no doubt that it had a similar form, origin, and use. The truffle when gathered for eating is about the size of a large walnut, and has a very peculiar smell. The flavour is not remarkable, and resembles in some measure that of the mushroom and morel.—*Eng. Cyc.*

(8354) TUBER MOSCHATUM, Musk-Scented Truffle, has a roundish smooth blackish appearance, and is a much rarer plant than the last. It has been found in Great Britain, and is characterised by the musky odour which it gives out.

The genus *Rhizopogon* has a sessile uterus, bursting irregularly, and marbled internally with anastomosing veins and sessile sporangia. The *R. albus* of Bulliard is the *Tuber albus* of older botanists, and is called White Truffle, and by some writers, from its Greek appellation, Root-Beard.—*Eng. Cyc.*

(8355) TUBICOLIDÆ (Lamarck), a family of Conchiferous *Mollusca.* Lamarck observes that the *Tubicolidæ* are undoubtedly conchifers, but of such great singularity, that some among them have been referred to other classes by modern naturalists; and he adds that it is singular to find a bivalve shell inclosed in a testaceous tube, and still more singular to see it incrusted in or built into the wall of that tube, and concurring to complete such wall. The singularity of the *Tubicolidæ*, as well as that of the *Pholades* has, he further remarks, caused a misconception of the real essentials of the shells which belong to the family, namely, two similar, equal, regular valves, articulated by a hinge. As in the shells of the *Tubicolidæ* there are some which have accessory pieces apart from these valves; so, as one sees in the *Pholades*, some naturalists have taken them for multivalve shells, a notion which has given rise to very odd associations. The animals of this family are borers, burrowing in stone, wood, and even in thick shells; but some, nevertheless, live in the sand.

The following six genera are arranged by Lamarck under this family:—*Aspergillum, Clavagella, Fistulana, Septaria, Teredina,* an *Teredo.*

(8356) *Aspergillum Clavagella* and *A. Fistu ana.*

(8357) *Aspergillum Javanum* is a native the East India Ocean. The animal of *A. vagin ferum* has been found by M. Ruppel, and appears to bear much analogy to that of *Phola.* It is a native of the Red Sea.

(8358) *Fistulana.* This genus has the sheat tubular, most frequently testaceous, more conve and closed posteriorly, attenuated towards it anterior extremity, open at its summit, containing a free and bivalve shell; the valves equa and gaping when they are closed. Anim having at its anterior part two cyathiferous calamules. (Lam.) *Fistulana clava*, is a native of th East Indian seas. The *Fistulanæ* inhabiting free tube have been found in sands or hard mu with the small end of the tube uppermost.—*Eng. Cyc.*

(8359) TUBULIBRANCHIATA, an order o Gasteropodous *Mollusca*, consists of the gener *Vermetus, Magilus,* and *Siliquaria.*

(8360) *Vermetus* (Adanson), has a tubular shell the whorls of which, in the early age of the animal form a kind of spire, but afterwards are prolonged into a tube more or less twisted or bent, like those of the tubes of *Serpulæ.*

(8361) *Vermeti* have been found at depths varying from near the surface to twelve fathoms in sponges, under stones, on shells, in coral-sand, and sand.

(8362) *Siliquaria* (Brug,) resembling *Vermetus* in the head, in the position of the operculum, and in the tubular irregular shell, which has, however, throughout its length a slit which follows all its windings, and which corresponds with a similar slit in the mantle which covers the branchial cavity. Along the whole length of this slit adheres a branchial comb, composed of a great quantity of foliations, distinct and, as it were, tubular. Linnæus placed them with the *Serpulæ*, and Cuvier observes that in these later times some have believed that they belong to the class of Annelids. Thus Lamarck supposed *Siliquaria* as well as *Vermilia* to be approximated to the *Serpulæ.*

Seven recent and ten fossil species have been recorded.

(8363) *Siliquaria muricata*, a native of the Indian Seas, may be taken as an example.—*Eng. Cyc.*

(8364) TUGAR. TIRAIMUN; UPAOON TABERNÆMONTANA CORONARIA. The sweet-scented wood and root are imported from Delhie and Kotah: considered and used as a stimulant; but chiefly used in scents.—*Gen. Med. Top. p.* 152.

(8365) TUKHM-GANDAH. A seed from Delhie, considered astringent.—*Gen. Med. Top. p.* 152.

(8366) TUKM-KURPUS. Seed of a plant from Delhie, astringent, and stimulating, given in flatulent indigestion, two Rupees a seer.—*Gen. Med. Top. p.* 159.

(8367) TUNG OIL TREE, of China. "This," said he, "is the Tung-oil tree, which yields a valuable oil, much used by carpenters; this is the Lew-san tree (Cryptomeria Japonica), valued for its ornamental appearance and fine timber."—*Res. among the Chi. p.* 184.

(8368) TUNICATA, a family of Acephaloid mollusca. Forbes and Hanley, in their 'History of British Mollusca,' describe three genera of *Tunicata*:—

1. *Ascidia*,—Body sessile,covered with a coriaceous or gelatinous tunic; branchial orifice 8-lobed and 6-lobed. There are 16 species of this genus found on the British coasts.

2. *Molgula*, E. Forbes.—Body more or less globular, attached or free, with a membranous tunic, usally invested with extraneous matter; orifices on very contractile and naked tubes; the branchial 6-lobed, Two species are British.

3. *Cynthia* of which there are 13 species.—*Eng. Cyc.*

(8369) TUPAIA, Sir T. Stamford Raffles's name for a genus of *Mammalia* which Dr. Horsfield places among Cuvier's Insectivorous Carnassiers, the *Feræ* of Linnæus, and the *Falculata* of Illiger. It has the following generic characters:—Head oblong depressed. Snout long, equally attenuated; nostrils lateral, semilunar. Eyes very large, and rather prominent. Ears large and oblong. Body cylindrical, covered with close fur and soft hairs. Tail longer than the body, linear, compressed. Feet plantigrade and pentadactyle, the soles naked the toes compressed and the claws falcular. In the Malayan language the name of *Tupaï* is a general term for various small animals which have the external form and agility of the squirrel.

(8370) TUPAIA JAVANICA; Bangsring, or Sinsring, of the Javanese. Dr. Horsfield says that this species has the appearance of a sprightly animal, a character with which its manners, as far as they are known, perfectly agree. "Its body," says Dr. Horsfield," is graceful and handsomely formed, and its limbs are slender and fitted for great agility: its size and exterior habits so nearly resemble the individuals of that family which Illiger has denominated *Animalia Agilia*, that, on a superficial view, it has been considered to belong to it. Our animal agrees with one of the most numerous sections of this family, the Squirrels, in the form of the body, the proportional length of the extremities, the breadth of the tail, and the faculty of carrying it on the back as a plume; but the succeeding details will show that its structure and organisation are essentially different."

$$\text{Dental Formula —Incisors,}\frac{2}{6}\text{; Canines,}\frac{2}{2}\text{; Molars}\frac{14}{12}.$$

Dr Horsfield describes the claws as sharp, compressed, and curved; and, in comparison with those of *Sorex* and several other genera of this order, of considerable strength: they are, he observes, individually supported by a small protuberance similar to that which is found in the *Tarsi*; and the construction of the claws in the Bangsring is adapted, he remarks, to the same food and habits as those of the other species of *Tupaia*. The linear tail, of the same length as the body, is compressed, with the hairs spreading far on each side; but, adds Dr. Horsfield, it is less full and ornamental than in the Squirrel. The fur of the Bangsring is close, silky, and delicate, with a few longer, more rigid, and darker-colored hairs dispersed among the long and straight hairs closely applied to the skin, with which the back, neck, sides, tail and extremities above are furnished. The upper parts are brown slightly diversified with gray of different shades; the lower parts dirty white, with a slight tint of grayish: the tail agrees with the upper parts; and the scapular line, is nearly an inch long.

The Bangsring fell under Dr. Horsfield's observation during an early period of his researches in Java. In traversing the province of Blambangan, in 1806, he discovered it in the extensive forests which almost entirely cover the eastern extremity of the island; and he thinks that its range, though it may not be confined exclusively to that province, is extremely limited.

Sir Stamford Raffles states that a tame *Tupaia ferruginea* was suffered to go about at perfect liberty, ranged in freedom over the whole house, and never failed to present himself on the breakfast and dinner table, where he partook of fruit and milk.—*Eng. Cyc.*

(8371) TURANJ-BIJ, Turanjabeen, Saccharine grain imported from Bombay used in purges; one seer costs ten rupees.—*Genl. Med. Top. p.* 153.

(8372) TURBANDS, COTTON. The principal site of this manufacture formerly was the Town of Arnee in the Chingulput district, but they are now made at Oopada in the Rajahmundry district and also in the district of Madras.

(8373) TURBANDS, SILK. The principal site of the manufacture of these silk Turbands was Seringapatam in Mysore. They are of a pink colour and are sold at from Rupees 10 to 25 Rupees each.

(8374) TURBINIDÆ, a family of Gasteropodous *Mollusca*, Linnæus places his genus *Turbo*, in his last edition of the 'Systema Naturæ', between *Trochus* and *Helix*, with the following characters:—Animal a *Limax*, or Slug. Shell univalve, spiral solid. Aperture narrowed,orbiculate, entire. In Woodward's 'Manual of the Mollusca' the

Turbinidæ are thus defined;—Shell spiral, turbinated or pyramidal, nacreous inside; operculum calcareous and paucispiral, or horny and multispirial. Animal with a short muzzle; eyes pedunculated at the outer bases of the long and slender tentacles; head and sides ornamented with fringed lobes and tentacular filaments (cirri); branchial plume single; lingual ribbon long and linear, chiefly contained in the visceral cavity; median teeth broad; laterals 5, denticulated; uncini very numerous (sometimes nearly 100), slender, with hooked points. The shells of nearly all the *Turbinidæ* are brilliantly pearly, when the epidermis and outer layer of shell are removed. Many of them are used in this state for ornamental purposes. The following genera are embraced in the family thus defined.—*Eng. Cyc.*

(8375) *Turbo.* Shell turbinated, solid; whorls convex, often grooved or turberculated; aperture large, rounded, slightly produced in front; operculum shelly and solid, callous outside and smooth, or variously grooved and mammillated, internally horny and paucispiral. In *T. sarmaticus* the exterior of the operculum is botryoidal, like some of the tufaceous deposits of petrifying wells. Animal with pectinated headlobes. There are 60 recent species which are found principally in tropical seas. The fossil species amount to 360, found in the Lower Silurian rocks.

(8376) *Phasianella.*—Shell elongated, polished, richly coloured; whorls convex; aperture oval, not pearly; inner lip callous, outer thin; operculum shelly, callous outside, subspiral inside. The *Phasianellæ* are always smooth. This polish, and still more their continual movements, prevent them from being covered with *Serpulæ*, *Flustræ*, and other parasites which encrust sluggish shells. This agitation makes it difficult for them to preserve the contour of their aperture perfect, for it is very frail. Woodward records 25 recent and 70 fossil species.

(8377) *Imperator* has the shell trochiform, thick, with a flat or concave base; whorls keeled or stellated; aperture angulated outside, brilliantly pearly; operculum shelly. The species, about 20 in number, are found in South Africa, Australia, and New Zealand.

(8378) *Trochus.* [TROCHIDÆ]

(8379) *Rotella.*—Shell lenticular, polished; spine depressed; base callous; lingual teeth 13; uncini numerous, subequal. There are 10 species found in India, the Philippines, China, and New Zealand.

(8380) *Monodonta.*—Shell turbinated, few-whorled; whorls spirally grooved and granulated; lips thickened internally and grooved; columella toothed, more or less prominently and irregularly; operculum horny and many whorled. There are 10 species found in West Africa, the Red Sea, India, and Australia.

There are 80 fossil specis.

(8381) *Stomatella.*—Shell ear-shaped, regular spire small; aperture oblong, very large and oblique, nacreous; lip thin, even-edged; operculum circular horny, multi-spiral. They are found on reefs and under stones at low-water.

Twenty species are recorded from the Cape, India, North Australia, China, Japan, and the Philippines.

(8382) *Broderipia*, Gray.—Shell minute, limpet-shaped, with a posterior submarginal apex; aperture oval, as large as the shell, brilliantly nacreous. Three species are found in the Philippines, Grimwood's Island, and the South Seas. (Cuming).

(8383) TURBITH, (MINERAL). The name given by chemists to the sub-sulphate of mercury.

(8384) TURBITH, TURPETH. The cortical part of the root of a species of *Convolvulus*, brought from different parts of the East Indies. It is a longish root, about the thickness of the finger, resinous, heavy, of a brownish hue without; and whitish within. It is used in medicine. —*Lewis's Mat. Med.*

(8385) TURBOOZ —CUCURBITA CITRULLUS.—Water Melon. This is grown in the bed of rivers in the hot season, but may be cultivated in gardens during the rains.—*Riddell.*

(8386) TURBOT. BRACHIRUS: A small flat Tenasserim fish with the aspect of the turbot, with two pectorals, the dorsal, caudal and anal united, and of a dark grey colour on the upper or right side, is sometimes in market.—*Mason.*

(8387) TURDUS. THRUSH. M. Homeyer has discriminated the Missel Thrush common in the W. Himalaya from *Turdus viscivorus* of Europe and has designated it *T. Hodgsoni*: it certainly does appear to be somewhat larger than the European bird, with more of the albescent line on the outer tail-feathers; and these differences must be admitted to be appreciable, however trivial, and whatever may be the value to be rightly attached to them: that, however, is a subsequent consideration, in which zoologists are never likely to concur; but all will admit that every appreciable difference should be noted, whether or not it be desirable that a new specific name should be imposed in every such instance.—*Cal. Rev.*

(8388) TURMERIC.

Zur-sood, Tumr, ARAB.
Arsina, CAN.
Tumr, EGYPT.
Keang-whang. CHIN.
Hullud Huldee, Daroo-Hullud (an inferior kind), HIND.
Turtumaglio, IT.
Curcuma, LAT.
Zurd choobeh, PERS.
Kurkum, HEB.
Haridra, SANS.
Munjil, TAM.
Passapoo, Pampi, TEL.
Mangellacua, MAL.

The dried roots or bulbs of a tropical plant (*Curcuma longa*), are oblong, tough, externally yellowish-gray, and internally of a deep yellow colour, with an aromatic smell, and a bitterish acrid taste. In India turmeric is used as an ingredient in curries, in dyeing, in medicine, and in some of the religious ceremonies of the Hindoos. It is produced in Bengal, Java, China, Malabar, and other places.—*Faulkner*. This article of commerce is furnished by the branches of the rhizome, or root-stock of the Curcuma longa, and C. rotunda, plants which are natives of Eastern Asia, but have been grown in England and the West Indies. They thrive well in a rich light soil, and are readily increased by offsets from the roots. In the East Indies, where it is known as Huldee, turmeric is much employed in dyeing yellow principally silks, but the color is very fugitive. It is also used medicinally as an aromatic carminative and as a condiment it enters into the composition of curry sauce or powder, and many other articles of Indian cookery. It is cordial and stomachic, and considered by the native doctors of India an excellent application in powder for cleansing foul ulcers. It is grown in and exported chiefly from Bengal and Malabar, Madras, Java, and China. The turmeric of Java is in high estimation in the European markets, ranking next to that of China and being much superior to that of Bengal The price of turmeric in London is from 32 s. to 20 s. per cwt., according to quality. The entries for home consumption are about 4,000 to 5,000 cwts. annually. It is better shipped in casks or cases than in bags. A kind of arrowroot is prepared from C. angustifolia another species of this tribe of plants. Amaranthus gangeticus, and another species, are much cultivated by the Hindoos for their stews and curries. The quantity and value of the curry stuff imported into Ceylon chiefly from India has been in the last few years as follows ;—

	Quantity.		
Years	cwt	Package.	Value.
1847	......	......	6,866
1848	......	......	9,981
1349	29,347	109	9,664
1850	24,399	300	7,267
1851	31,550	.....	9,446
1852	......	......	9,036

'Curry stuff" was imported to the extent of 32,009 cwt. in 1852. There are two varieties of turmeric usually sent into Europe from the East (whence all the turmeric imported into Europe is obtained), the "long" turmeric (*Curcuma longa*), and the "round," or as it is better known the "Chinese turmeric." The latter description is very rare, the former is the common article of commerce. According to one correspondent, Mr. Hepburn, chemist, of Falmouth, Jamaica, the common or long turmeric is indigenous in rather damp, soils, its locality being in the vicinity of rivers, watercourses and sporings. In this respect it differs from ginger, which requires a rather dry soil for its culture. Simmonds is not aware that this plant possesses the property of impoverishing the soil like the ginger. From the general habits of the plant in its natural state, we may gather the following rules for our guidance in its culture. The plants should be laid down in rows of five or six inches distant from each other, in a soil moderately damp, of an aluminous or clayey nature, and free to a great extent of the more soluble alkalies, potash and soda, as these, by absorption, may destroy the coloring matter of the plant, and so diminish its value as a dye-stuff. Finally, in preparing the roots for exportation, they should be cleansed from all earthy practicles, exposed for drying in the shade, and without any further preparation bagged for shipment. The coloring matter of turmeric is of an orange yellow color, exceedingly delicate and capable of change, either from the action of light or of alkalies, which turn it to a dark brown color. It is slightly soluble in water, and readily soluable in an alkaline solution, becoming dark brown. Alcohol extracts the coloring matter. The uses to which turmeric is applied are two : as an ingredient in the curry powder and paste, and as a dye for silk. It was some time ago used as a medicine ; but though retained in the "Pharmacopœias" of the present day, it is entirely discarded by the practitioner as a curative agent. The best Bengal and Malabar turmeric fetches a price nearly as high as that of ginger, and there is no reason why the West India planter could not send it into the British market quite as cheap as the East India trader. According to Dallas, 397 bags of turmeric were exported from Jamaica in 1797. Turmeric is grown about the city of Patna and Behar. It is much cultivated about Calcutta and all parts of Bengal. One acre yields about 200 lbs. of the fresh root It is also grown on the central table land of Affghanistan. The exports from Calcutta in 1841 were 11,000 Indian maunds, and 28,137 in 1842. The value of that exported from Madras in 1839 was 40,000 rupees, or £4,000 ; in 1840 £4,200. The quantity shipped from that Presidency in 1850 was 6,877 bags. In the neighbourhood of Dacca about 200 lbs. of seed is sown to the beegah, measuring 80 cubits by 80, and the yield is from 640 to 800 lbs. 140 tons were imported into Liverpool in 1849, for dyeing and for curries ; 414 tons in 1850 ; 11,554 bags and packages in 1851 ; and only 3,595 ditto in 1852. The price in January 1853 was, for Bengal, 10s. to 12s.; China, 12s. to 14s., and Malabar 9s. to 11s. the cwt. The imports into London were 18 tons in 1248, 191 tons in 1848, 260 in 1849, and 870 tons in 1850, In China turmeric is used with Prussian blue in coloring and facing tea.—*Simmonds*.

Specimens at the Madras Exhibition of 1855, were exhibited as a root from Trichinopoly, Tinnevelly, Madura &c. and in a prepared state from Goa. The root affords a yellow dye which is brilliant, but not permanent. It enters into curries and is largely used by native females as a paste to colour their faces. Dr. Pereira considered Madras Turmeric "as the most showy of all kinds of Turmeric," and the Jury observe the tubers are very large and the colour a bright yellow.—*M. E. J. R.* Turmeric is now imported into England to the extent of upwards of 800 tons, a portion of this is used in dyeing. Besides using turmeric for both food and medicine, the Burmese and Karens dye with it a bright yellow, but it is not very permanent.—*Mason.*

Turmeric, its adulterations.—From what has been shown above it will have been seen that Turmeric powder consists of the ground tubers of Curcuma longa, a plant which is extensively cultivated in the neighbourhood of Calcutta, in Bengal as also in China and Cochin China. The bulbs are small and furnished with numerous long palmate tubers, internally of a deep orange colour. There are two descriptions of tubers the one round, the other long; but both are yielded by the same plant. The first are round, oval or ovate, about two inches long, and one inch in diameter, pointed at one end, and marked externally with numerous annular wrinkles. The second are cylindrical, not exceeding in thickness the little finger; two or three inches long, somewhat contorted, tuberculated. Both kinds are yellowish, externally more or less orange yellow, passing into reddish-brown. The fractured surface has a waxy appearance. The odour is aromatic, somewhat analogous to ginger, but peculiar; the taste is aromatic. When chewed, it tinges the saliva yellow. Its powder is orange yellow. The tubers are frequently worm-eaten. The following varieties of turmeric are known in the English markets, and are thus described by Dr. Pereira:—

1. *China Turmeric.*—This sort consists of smooth, plump, round, and long tubers, of a greenish hue extenally. They yield a bright powder, and on that account are much preferred for medical purposes. Thence they fetch a higher price than any other sorts of turmeric. Probably if much of it were brought to market it would not fetch more than the Bengal sort.

2. *Bengal Turmeric.*—This sort consists of thin or narrow long tubers which are moderately smooth externally, and of a greyish dull yellow colour. They break with a deep reddish fracture. Although from the dull appearance of its narrow tubers, it is not a very inviting sort to the inexperienced eye, yet it fetches a higher price than the Madras sort, on account of its being a much stronger dye.

3 *Madras Turmeric.*—This is the most showy of all the kinds of turmeric. It consists principally of large long tubers, but mixed with transverse sections of round tubers. Externally the tubers are marked by longitudinal wrinkles, the surface of which is rubbed and bright yellow, internally the colour is that of a fresh fractured surface of gamboge.

4 *Malabar Turmeric and Bombay Turmeric.*—The sort is not constantly found in the market. It consists principally of long tubers, the round tubers being few, and of a very inferior quality. This sort of turmeric is smaller and more shrivelled than the Madras sort, but otherwise somewhat resembles it.

5 *Java Turmeric.*—Not frequently found in the English market, in a general way it may be said to resemble the China sort. It consists of both round and long tubers, but chiefly the latter. They have a greenish-yellow hue Under the name of bulbs of Batavian Turmeric, Dr. Hassall received a sample of round tubers, said to be from Java. Dr. T. Martius notices this sort as having been brought, for many years, from Batavia, and adds that it contains much colouring matter, and is probably the produce of Curcuma viridiflora.

The composition of Turmeric is shown in the following Analysis.

John's Analysis.

Yellow volatile oil	1
Curcumin,	10 to 11
Yellow extractive	11 to 12
Gum,	14
Woody fibre,	57
Water and loss,	7 to 5
	100

Vogel and Pellitier's Analysis.

Acrid volatile oil.
Curcumin.
Brown colouring matter.
Gum (a little)
Starch.
Woody fibre.
Chloride of calcium.
Turmeric.

The wood curcumin is applied to the resinous colouring matter of turmeric, which is soluble only in ether. The cheapness of turmeric-powder and the comparatively small quantity of it used explain the reason of its having hitherto not reached the hands of the adulterator. Turmeric is free of duty Wholesale price, 6 s. to 14 s. per. cwt. —*Food and its Adulterations, p.* 296.

(8389) TURNIPS.—Brassica Rapa. In general grow indifferently at Madras, require a free light soil; for growing this vegetable, the manure applied to the soil ought to be kept near the surface, there is one variety, the yellow Maltese worthy of a trial on the plains; raised from seed, sown broad cast, when the plants have formed a few leaves they should be thinned to about 6 inches apart; used in soups, stews, &c. —*Jaffrey.*

(8390) TURNIPS, ANNUAL, are cultivated in all parts of the Deccan at the commencement of the rains and the cold weather. They continue until the latter end of February, and go to seed easily. The soil should be rich and light, and they may be sown broad-cast, and then transplanted, either in rows or ridges, and a space of at least six fingers' breadth allowed between each. In the rains a small caterpillar is bred on the leaves, which, if not removed, will destroy the whole. The sorts are white, and red; one species grows above the ground.—*Riddell.*

(8391) TURPENTINE.

Ratenuj-roomie. Butum, Arab.
Terebenthine, Fr.
Turpentin, Ger.
Turpintine, Guz. Hind.
Trementina, It.
Teebinthina, Lat.
Kota, Nep.
Zungbarie Pers.
Terpentyna, Pol.
Skipidar, Rus.
Kelon ka tel, Hind.

A name for several juices of trees, chiefly of the pine tribe. They agree in most of their properties, being originally fluid and transparent, of strong and rather pleasant odour, and a pungent taste; inflammable, and soluable in oils, alcohol, and ether, but not in water. Turpentine is largely employed in the arts, especially in painting and varnishing, also in surgery —*Waterston.* The sources are as under.

(8392) *Larix* (or Cedrus) *Deodara* (Deodar and Kelon), or Himalayan Cedar, is an elegant and lofty tree, hardy as the Larch, and yielding valuable timber. It has been extensively introduced into England by the East India Company, and is interesting as having been long employed in medicine by the Hindoos, and known even to Avicenna. (*Hindoo Med.* 36.) Its Turpentine, known by the name *kelon-ke-tel*, is in great repute in the North-west of India, from its stimulant properties and power of healing deep-seated ulcers, as in elephants and camels.—*Royle.*

(8393) *Turpentine. Common. Terebinthina Vulgaris.* L. D. Resina liquida, L. Fluid Resin of Pinus sylvestris, *Linn.*, of various species of Pinus and of Abies, E. Common Turpentine either exudes naturally or from incisions from most trees of the Pine tribe, as also from *Pistacia Terebinthus* (*page* 333). It consists of Resin intimately mixed with a Volatile Oil, known in its separated or distilled state as Oil of Turpentine. In time, all Turpentines become converted into Resins, from the evaporation of the Oil and by its oxidation. They all soften by heat, burn readily, are soluble in Alcohol and Ether, unite with the fixed Oils, and resemble each other very closely in taste and smell; but differ in being more or less white or dark-coloured, and in the odour and taste being more or less agreeable. Water acquires only a little of their properties, but they may be made into an emulsion with eggs or vegetable Mucilage. Common Turpentine used to be procured from *Pinus sylvestris,* as it still is in many parts of Europe, and also from *P. maritima,* which yields the Bourdeaux Turpentine, and in winter the *galipot* of the French But Dr. Pereira has shown that almost the whole quantity of Turpentine imported to England is from America. This is procured chiefly from *P. palustris,* partly also from the *P. Tæda.* This Turpentine is viscid, semifluid, of a dull light yellowish colour, with a warm, acrid, rather bitter taste, and a moderate terebinthinate odour. When fresh, it yields 17 per cent. of Oil of Turpentine. (*W.* and *B.*) The Bourdeaux Turpentine is whitish, turbid, separates upon standing into a transparent liquid and into a granular honey-like semifluid. It is acrid and nauseous in taste, and of a disagreeable smell; yields about 20 per cent. of Oil. M. Faure discovered that it might be solidified by the aid of a 32nd part of Magnesia. Common Turpentine yields Oil of Turpentine and Resin, q. v., and is a constituent of Ung. Elemi (p. 345) and of Emp. Galbani (p. 424).—*Royle.*

(8394) *Venice Turpentine. Terebinthina Veneta* E. D. Fluid Resinous exudation of *Larix europæa.* Venice Turpentine. This, when genuine, is a thick tenacious fluid, usually of a cloudy appearance, of a yellowish-green tint, acrid and bitter in taste, of a strong peculiar odour. It is sold in Paris as Strasburgh Turpentine, and is distinguished by being less liable than others to solidify. (*Guibourt* and *Pereira.*) Dr. Thomson stated long since that the Venice Turpentine of the shops was imported from America: this is therefore only a substitute. What is usually sold is a mixture of Oil of Turpentine with common Resin. Venice Turpentine is intended to be a constituent of Emp. Cantharidis, E. and of Ung. Infusi Cantharidis, E.—*Royle.*

(8395) *Canada Balsam. Terebinthina* (BALSAMUM, E. D.) *Canadensis* L. Fluid Resin of ABIES (Pinus, L. D.) BALSAMEA. Canada Balsam is procured by breaking the vesicles which naturally form upon the trunks and branches, and then collecting their fluid contents. It is often called Balm of Gilead When fresh, it is nearly colourless, of light yellow colour, transparent like thin honey; solidifies slowly; is of a strong, rather agreeable odour, and a bitterish, rather acrid taste. It is also obtained by making incisions into the tree. Strasburgh Turpentine is sometimes substituted for it.—*Royle.*

(8396) *Abietis Resina.* L, THUS, D. Resin of ABIES EXCELSA, E. (*Pinus abies,* Linn.), L. D. The Resin of the Norway Spruce Fir may be arranged with the Turpentines as being a spontaneous exudation, and with the Resins as having lost by evaporation most of its Volatile Oil. It used to be called *Thus,* or Frankincense, as it still is in the D. P. It is collected in the form of concrete tears, which are hard and brittle, but soften readily at the temperature of the body. It is of a light yellowish or brownish-yellow colour externally, lighter within; slight terebinthinate odour and acrid bitter taste. This Resin is intended to be employed in making Pix Burgundica, Emp. Aromaticum, D. p. 541, Emp. Opii, L. E. D., Emp. Thuris, D. p. 129, Emp. Galbani, L. D., and Emp. Picis, L. E. The substance which the French call *galipot* or *barras* is the concretion produced on the Pine of the Landes, late in the year or in winter, when the collection of Bourdeaux Turpentine has ceased.

(8897) *Pinus morinda.* A very fine Resin is spontaneously yielded by the Himalayan *Pinus Morinda.—Royle.*

(8398) *Pix Abietina, L. Pix Burgundica*, E D. Burgundy Pitch is the Resin *Abies excelsa* melted in water immediately after being scraped from the tree, and strained through a cloth. It is thus freed from mechanical impurities, with a loss of little of its Volatile Oil. In all other respects it corresponds with it. But most of that which is sold is a factitious compound of Resin rendered opaque by the incorporation of water, and coloured by Palm Oil, or made from concrete American Turpentine. (*Pereira.*) This is used for making a Plaster as well as the Emp. Calefaciens (*v.* Cantharidis Comp. E.)

Action. Uses. The above Resin and Pitch are both Rubefacient.

(8399) TURPENTINE OIL. SPIRITS OF TURPENTINE.

Eau de raze, FR.
Turpentinol, GER.
Turpentine, GUZ. HIND.

Acqua di rasa, IT.
Aguarras, SP.

The essential oil drawn from turpentine by distillation. There are two sorts; the best, red, and the other white. Turpentine oil is extensively used in the manufacture of varnishes, &c.—*McCulloch.* The Oil of Turpentine, distilled from the Turpentine of the common long-leaved Fir, of the Himmalayas is considered 'in a letter from Mr. Hutchinson, to be of 'very superior quality.'—*Royle's Productive Resources of India.*

(8400) TURQUOISE.

Turquoise, FR.
Turkiss, GER.

Turchina, IT.
Turquesa, SP.

A precious stone, in considerable estimation. Its colour, which is its principal recommendation; is a beautiful celestial blue, which migrates into pale blue, and is sometimes tinged with green. It is destitute of lustre, opaque, and does not admit of a very high polish. It is much worn in necklaces, and every part of ornamental jewellery, and contrasts beautifully with brilliants or pearls, set in fine gold.—*Mawe on Diamonds. Turquoise* (*Calaite, Odontalite*), a Mineral occurring in botryoidal or mammillated masses. Colour greenish-blue, of various shades. Fracture conchoidal, rough, and uneven. Commonly opaque; sometimes translucent on the edges. Streak white. Hardness 5-0 to 6-0. Specific gravity 2-8 to 3-0. It occurs in alluvial clay in Persia. It has been found to consist of—

Phosphoric Acid	30.90
Alumina	44.50
Oxide of Copper	3.75
Oxide of Iron	1.80
Water	19.00
	——99,95

The Occidental Turquoise, found near Simon, in Lower Languedoc, is stated to be merely bone coloured by phosphate of iron. According to La Grange, it consists of—

Phosphate of Lime	80.0
Carbonate of Lime	8.0
Phosphate of Iron	2.0
Phosphate of Magnesia	2.0
Alumina	1.5
Water	1.6
	——95.1

(8401) TURRÆA, a genus of Plants belonging to the natural ordea *Meliaceæ*, named in honour of an Italian botanist, G. Turra of Padua. Many of the species are highly ornamental forming trees or shrubs in the interior of the Cape of Good Hope, in Madagascar, Mauritius, and in the eastern parts of India.

(8402) TUSBEEH, rosary or chaplet of beads, made of date stones: fish bones: cornelian: Mocha stones: pearls: mother of pearl: coral: the seeds of the Canna Indica or Indian shott, olive stones, onyx, ebony; ocimum pilosum basilic basil; Agati: the seeds of the Corypha umbraculifera, the Earth of karbillah, Sandal: and the stones of the Cicca disticha, ehlulimilli or churmayla.—*Herklots.*

(8403) TUSSAH. *Tam.* DASARI. A species of silk goods prepared from a wild Silk, in some districts in Bengal, of a fine description much used for ladies and children's dresses, and in most parts in India for Native use being worn by them for certain ceremonies and while bathing: it has lately become an article of export. *See Silk.* In an account published by Dr. Walker (Journal As. Soc. No. 31) the following history is given of the production and preparation of the tusser silk. The tusser breeders are a class quite distinct from the weavers, and are either Telingas of low caste or Gonds; the former reside principally at Chilpore, Madapore, and Chinnore. At Madapore, which may be regarded as the centre and head quarters of the tusser breeders there are at least seventy families. The tusser breeder never thinks of keeping up the breed of the insect throughout the year. When the leaf is off the tree about the middle of March he deems his occupation gone, and he leaves the object of his former excessive care to shift for itself thinking of nothing but the present case which may be summed up in a few words, sloth, a bare subsistence and an occasional debauch in his nectar, palm toddy. But with the rains returns his toil, and some little difficulty is experienced in procuring insects for a fresh campaign. If he can gather a dozen of promising cocoons which his experience tells him are of females, he is quite satisfied. Carefully does he watch the bursting of the cocoon, and much care does he take of its winged inmate, having previonsly prepared for it a house of teak leaves dried. The male is not tardy in approaching. Impregnation takes place, the male dies, and in four days after laying her eggs, the female also. The eggs are in number about sixty : of these one half prove abortive while the others are hatched in ten days. The small insect is fed on the tender leaves of the Careya sphærica, and in six weeks spins its cocoon; the first brood are spared and allowed to burst their cocoons to supply a sufficient quantity of ova for the tusser harvest, the same process is described as again gone through, with this exception, that the young worms are are this time fed on the leaves of the Pentaptera tomentosa, as those of the Carcya sphærica are by this period of the season, supposed to have acquired some influence noxious to the insect. It is during the progress of the worm from the egg to the formation of the cocoon that every energy of the Tusser breeder is called into action for the preservation of his charge. Every animal footed, winged and creeping, is said to be the enemy of the tusser grub. Ants destroy them, kites and cows prey on them, snakes devour them, and squirrels are said to make a repast of them. To protect them first from their insect enemies, the tusser breeder, ascends the muddy tree (Pentaptera tomentosa) the leaves of which are the insects food, every branch he carefully clears of the different species of ants by which they may be infested preventing the access of others by surrounding the trunk of the tree at its foot with ashes. The other enemies are kept off by shouting, throwing stones, firing guns &c. Their life at this time would appear by their own account, to be one of the most unremitting toil, to devote themselves to which they forswear not only every indulgence but evey comfort, and it rouses the apathetic peasant of Telingana to eloquence when he recounts what privations he undergoes, what pleasure he derives himself, and what incessant labour he incurs, while watching the rearing of the worm, and the perfecting of its work. The tusser butterfly is a species of Suturnia, probably the aphia, described by Dr. Helfer as the most common of the native species. From four to five hundred of the cocoons are sold o the Banyas and weavers for one rupee ; he moth is killed by means of heat. There re three tusser harvests, one at the end of he rains. the other two in the cold season. The winding of the silk is accomplished by boiling the cocoons, separating the floss, of which no use is made ; and twisting eight or ten filatures from as many cocoons on the middle of the thighs with the left hand of the workman and to be wound on the instrument ; this instrument, the middle bar of the wood, is held lightly in the hand of the workman and made to move in a semicircle. An ounce and a quarter of silk is the average daily winding of a single workman, his wages are at the common rate of one pice for winding the silk of fifty cocoons, about three piee a day, as he cannot wind more silk than from a hundred and fifty cocoons. The pice, however, are large, and go there by eight to the rupee. The only dyes used for the tusser silk, as far at least as my observation or inquiry has gone, are the flowers of the palas, *Butea frondosa*, and turmeric ; by the former the usual familiar colour is produced ; by the latter a golden yellow is brought out after the threads are for sometime immersed in a solution of ashes. The warp threads are stiffened with rice congee.—*Rohde, M. S. S.* Tusser or Jungle Silk, the produce of a Saturnia, is made into sarees, punchees and scarfs, at several towns of the Sircar of Warungul. But the chief seat of the Tusser manufacture is the town of Mahdapore—on the right bank of the Godavery in the Ramgheer Sircar, where the moth that yields it is carefully reared, and from whence raw tusser silk is sent to other parts to be woven into cloth. The insect in its grub state is first fed on the tender leaves of the Careya sphœrica, and when more grown, on the leaves of the Pentaptera tomentosa—much watching and attention are bestowed in rearing the animal, subject as it is to destruction from birds, insects, and squirrels. The Tusser cloths produced at Mahdapore are in durability and fineness very inferior to the cloths of the same kind manufactured in Bengal—they are dyed the same colour, and with the same materials as the silks of which they are about one half the price. At Mahdapore there are seventy to eighty families employed in rearing the insect and the manufacture of the cloth, which is prepared principally for the Hyderabad market. CUTH. DAVIDSON, Assistant Resident. At the Madras Exhibition of 1855, Cocoons, from which this description of silk is obtained, were exhibited from several localities. They are formed by caterpillars of several species of moth, belonging to the genus Saturnia. That which is most commonly met with in Southern India, appears to be S. Pahia. The caterpillar feeds on the leaves of the country Almond tree (*Terminalia catappa*) where it is often called the almond moth. It is also found on the leaves of the Ber tree, (*Zizyphus jujuba,*) the Casuarina, &c. The cocoons are ingeniously attached to the twiggy branches of the Ber, by a long stalk terminating in a ring, encircling the branch. In the thicker foliage of the Casuarina, the silk is woven among the leaves without the above provision. It does not appear, that silk in any quantity has been obtained from this source in the Madras Presidency. Considerable quantities of the small silk cloths worn by Brahmins at their meals are imported into the Northern Circars, from Cuttack. The only use to which the cocoons appear to be turned is that of a ligature for native matchlocks. They are cut spirally into long narrow bands, with which the barrels are tied to the stocks. Dr. Roxburgh in the 7th vol. of the Linnean Transactions, has described the preparation of the Tussah silk of Bengal, which is derived from two different species of Saturnia. One called *bughy* by the natives of Beerbhoom, appears to be the same as the Madras species, (S. Paphia,) and is stated to feed on the Ber tree and on the Asana (*Pentaptera glabra*). The other termed *jarroo* by the natives of the same province, is the S. Cynthia, and is domesticated. The caterpillars are fed on the leaves of the castor oil plant (Ricinus) whence it is called the Arrundy, or Arundi silk worm, but it also eats the leaves of the Ber and Asana. Colonel Sykes has a paper in the 3d vol. Trans. Roy. As. Socy. Lond. on the cocoons of S. Paphia found by him in the Deckan under the designation of the *kaliswar* silk worm, which he states is met with on the Ber tree (*Pentaptera glabra*). Teak tree and common Mulberry. The Chinese Tussah is said to be obtained from *Saturnia Atlas*, which is also to be met with in Southern India. Another species of Saturnia (*S. Selene*) the posterior wings of which are prolonged into a tail-like process is common in Southern India. The caterpillar may be observed, feeding in considerable numbers on the Odina wodier, or Besharm tree in February and March. Its chrysalis is enveloped in a silky covering, so like that of S. Paphia that it would probably be found to yield a strong and useful thread. It may be worth while to direct attention to the silk spun by several smaller specimens of Bombyx moths, found on different species of Cassia, Acacia and Phyllanthus. A gregarious caterpillar (a species of Lasiocampus) may be observed clustering in great numbers on the stem of the Guava, the Jamoon (Syzygium jambolanum,) and probably other trees: the silky covering of these also seems deserving of examination. Lieut Colonel F. Cotton sent some of the cocoons gathered by him when exploring the Godavery.—*Jury. Reports, Madras Exhibition of* 1855.

Saturnia, this alluded to, is a genus of insects belonging to the order *Lepidoptera* and the family *Bombycidæ*. The antennæ are fringed in the male; the head is small the wings are very broad and entire; the palpi and trunk are wanting.—*Eng. Cyc.*

Saturnia Pavonia minor, the Emperor Moth, is one of the handsomest of the British species of Moths. It is about 3 inches wide. The colour is grayish-brown, faintly tinged wit purple; the hinder margin of all the wing has a band of pale brown and purple th hinder band being much waved. The centr of each wing has a large spot or ocellus which is placed on a light ground: it consist of a black pupil, with a yellow or gray iris and partly surrounded by a light blue cres cent. The larva is of a green colour having a blac band on each segment adorned with pink tuber cles bearing a whorl of six hairs diverging lik a star. It constructs a curious cocoon, th extremity not being closed, but terminated by converging circle of very stiff hairs, whic enables the insect to make its escape from withi but completely prevents all ingress.—*Eng. Cyc* To the genus *Saturnia* some of the largest o the *Lepidoptera* belong

Saturnia Atlas, the Giant Atlas Moth, has wings measuring 7 or 8 inches across. This species also with *S. Cecropia* and *S. Luna* have their wings produced into a tail The cocoons of *S. Cynthia* and *S. Mylitta* are used in India for the production of silk. Latreille states that these are the wild species of silkworm of China. *S. Cynthia* is the Arrindi Silk Worm of India (Roxburgh, ‘ Linn. Trans,’ vol. vii.) *S. Promethea*, a North American species, forms its cocoon within the leaf of a sassafras-tree, having previously fastened the stalk of the leaf to the stem by a strong silken web, whereby it is prevented from falling with the other leaves (Westwood.)—*Eng. Cyc.* At the Universal Exposition held in Paris, in 1855, samples of Indian silk were exhibited with the cocoons of the different species of the Bombyicidæ from the Bombyx Mori. pat Saturnia Mylitta, tussah; Saturnia assamensis, monga; Attacus Cynthia, eri or eriah.—*Rapport du Jury mixte international, page* 54.

(8404) TUSSILAGO FARFARA, *Linn.* Leaves and Flowers of Coltsfoot. Coltsfoot has a creeping root-stock. Leaves, which make their appearance after the flowers, on channeled footstalks, roundish, cordate, angular, sharply toothed, of a glaucous green above, cottony beneath. Flower-heads appear in early spring, of a bright yellow colour, solitary, drooping while in bud, erect when in flower and seed; flower-stalk covered with smooth, scale-like, reddish bracts, many flowered, heterogamous. Florets of the ray female, narrow, ligulate, ray spreading. Florets of the disk male, tubular, with a campanulate 5-cleft limb. Receptacle naked. Involucre of one row of scales, oblong, with membranous margins. Styles of the disk inclosed, abortive; of the ray bifid with taper arms. Achænium of the ray oblong, cylindrical, smooth, of the disk abortive. Pappus of the ray of in many rows, of the disk in one row consisting of very fine setæ.—Chalky soils in England, found in many parts of

Europe, extending to Persia and the Himalayas. St. & Ch.t. 20.

Action. Uses; This plant is mucilaginous and slightly bitter, and may be employed as a demulcent possessed of a little tonic property. It may be prescribed in the form of an Infusion or Decoction (one or two ounces to a pint of water) *ad libitum*.—*Royle.*

(8405) TUTENAGUE OR CHINA SPELTER. This is an alloy of iron, copper and zinc. It is harder than zinc, though less so than iron, sonorous, compact, and has some malleability. The fresh fracture is brilliant, but soon tarnishes. Till superseded by spelter from Silesia it was clandestinely exported in large quantities (more than 50,000 cwt. annually) to India, but is now seldom or never shipped; spelter being on the contrary imported to compete with it in China. For boxes, dishes, household utensils, and other similar purposes, tutenague is well adapted. The art of making it is not known to Europeans. Its export price used to be about 14 dollars a pecul. —*Comp. Desc.*

(8406) TWEEDIA. ASCLEPIACEÆ. Tweedia Cœrulea.—These plants bear blue flowers, and succeed well in a sandy peat soil, and are readily grown from seed.—*Riddell.*

(8407) TYLOPHORA, a genus of plants belonging to the natural order *Asclepiadaceæ*. *T. asthmatica* is very common in the peninsula of India, and called in Telinga 'kaka-palla.' Dr. Roxburgh describes it as being frequently employed here as a substitute for ipecacuanha.—*Eng. Cyc.* Dr. Wight gives figures of Tylophora asthmatica, 1277; carnosa, 351; fasciculata, 248; Iphisia, 1276; mollissima, 1275; parviflora, 1274; and enuissima, 588.

(8408) TYLOPHORA ASTHMATICA. ASCLEPIAS ASTHMATICA.

Untamol, HIND. | Kaka palla, TAM.

The Cynanchum ipecachuana of Willdenow, by many writers is supposed to be the same as this species, and is common in Bengal. The root is of many long, thick, whitish, fleshy fibres, issuing from a small woody head. The dried roots of this article are of very great value, and according to the experience of Drs. Roxburgh and Anderson, confirmed fully by Dr. O'Shaughnessy's own trials, afford an excellent substitute for ipecachuana, if given in rather larger doses.—*O'Shaughnessy, page* 455.

Tylophora Asthmatica, affords a good substiute for flax. It is the Koorinja fibre of Tanjore *repared* from the Tylophora asthmatica: this is f fine quality, white, strong and silky. The plant rows abundantly in Southern India, and is used nedicinally. The Jury of the Madras Exhiition of 1855, considered it deserving of Honorable Mention, as a new discovery. The Koorinja, (*Tylophora Asthmatica*) yields a strong white Silky fibre resembling Flax, a small sample of it was then exhibited by the Tanjore Local Committee.—*M. E. J. R.*

(8409) TYLOPHORA BARK. UNTAMOL. Bark of root of Tylophora asthmatica must not be confounded with munntamul, the root of Hemidesmus Indicus.—*Ben. Phar.*

(8410) TYPHA. The genus *Typha* is known by the male and female flowers being uppermost; the stamens are setose, and united by the filaments; the ovarium is surrounded by setæ (*fig.* 4) and the style is persistent. There are three species of this genus, inhabitants of the temperate parts of the globe, and all are found in Great Britain. The name *Typha* is derived from Tφιος a marsh, because these plants grow in marshy places. In English they are called Cat's Tail and Reed-Mace, the former from the resemblance of their spikes to the tail of a cat. They are frequently called Bullrushes, but this name is restricted to another genus, the *Scirpus.*—*Eng. Cyc.*

(8411) TYPHA ANGUSTIFOLIA. Lesser Cat's-Tail or Reed-Mace, has linear leaves grooved below, with the sterile and fertile flowers removed at a little distance from each other. It is less frequent than the last species, but is not uncommon in the neighbourhood of London.—*Eng. Cyc.*

(8412) TYPHA ELEPHANTINA AND TYPHA ANGUSTIFOLIA; Bulrushes, *putera* and *reree*; their leaves are employed in making mats and baskets, in North West India and they are called *pun*. The pollen, like Lycopodium, is inflammable, and is collected in Sind, and there called *Booree.*—*Royle.*

(8413) TYPHA LATIFOLIA, Great Cat's-Tail or Reed-Mace, has linear nearly plane leaves, with the sterile and fertile flowers continuous. This is a very handsome European aquatic, and grows abundantly in damp marshy places, the leaves three feet in length and an inch in width. When the densely crowded spike is brushed and a lighted candle applied near it, a sudden flash is produced. This arises from the firing of the pollen that is diffused in the air. On the Continent the down of the flowers is used for stuffing pillows, &c. Cattle are fond of the leaves, and the roots are sometimes eaten as a salad. In common with *Sparganium* and *Scirpus* the leaves are used by coopers for filling up the interstices between the wood of their casks; also for making mats, chair-bottoms, baskets, &c. It is this plant which many of the Italian painters have put in the hand of Christ when he was mocked by the Roman soldiers as a king.—*Eng. Cyc.*

(8414) TYPHA MINOR, Dwarf Cat's-Tail or Reed-Mace, has linear-setaceous leaves, with barren and fertile flowers at a great distance. This plant, on the authority of Dillenius, has been placed in the list of British plants. It is found in the south of Germany and Switzerland. Kock calls it *T. minima*. [SPARGANIUM.]—*Eng. Cyc.*

(8415) TYPHACEÆ. BULRUSHES.

Pun, Booree, SINDEE.

Typhaceæ, *Typhads*, or *Bullrushes*, a natural order of Plants belonging to Lindley's spadicose group of Monocotyledons. The order includes two genera—*Typha* and *Sparganium*. They are herbaceous plants, growing in marshes and ditches, having stems without nodi and perennial rhizomata; the leaves are rigid, ensiform, and with parallel veins; the inflorescence is spicate or capitate, without a spathe; the flowers are unisexual; sepals 3 or more, sometimes merely a bundle of hairs; no petals; the male flowers have 3 or 6 stamens; the female flowers have a single, superior 1-celled ovary; the fruit is dry, 1-celled, and 1-seeded; the embryo is in the centre of the albumen. The species of the two genera are abundant in the northern parts of the world,—*Eng. Cyc.* Bulrushes, so conspicuous in the marshes of Europe, extend also to similar situations in most parts of India. The leaves are in some parts of Europe employed in making mats and winter coverings for plants, as well as for stuffing chairs, the leaves of *putera* and *reree* (or *Typha elephantina* and *T. angustifolia*) are employed in making mats in North-West India. Dr. Stocks informed Dr. Royle that in Sindh the former is called *pun*, and its leaves employed for making mats and baskets. The pollen, like that of Lycopodium, is inflammable, and used as a substitute for it in Europe. It is also collected in Sindh, and there called *booree*.—*Royle Fib. Pl. p.* 35. Bulrushes in Europe are used for putting between the staves of barrels, also for chair bottoms and matting. Typha bread is prepared in Scinde from the pollen of the flowers of the *Typha elephantina*, and in New Zealand from another species of bulrush (*Typha utilis*.)—*Simmonds*.

At the Madras Exhibition of 1855 th Trichinopoly Local Committee exhibited a larg collection of figures and Architectural Models, carved in the Pith of the Typha. Th attitudes of the figures were stiff but th draparies were characteristic. The figures introduced into the model of the Trichinopol Fort were out of proportion being far too larg for the scale of the buildings. There were pith Models of Pagodas of Trichinopoly and Salem Pith work made from the rushes, called "Nultee" in Tanjore. Model of the Pagoda —*M. E. J. R.*

(8416) TYPHONIUM, a genus of plants belonging to the natural order *Aroideæ*. The spath is convolute at its base. Spadix interruptedly androgynous below, with rudiments of the sexual organs below the stamens, naked, with a subulate apex. Ovaries with a single ovule, affixed at the base, erect. The species are all stemless herbs, indigenous to India.—*Eng. Cyc.*

(8417) TYPHONIUM ORIXENSE, is described by Dr. Roxburgh by the name of *Arum orixense*, and is common in the shady mango-groves near Samulkota, where the soil is dry and fertile. It is called Ghekool by the natives. Like many other of the *Aroideæ*, this plant is exceedingly acrid.

(8418) TYPHOON.

Ti-fan, CHIN. Tufan, ARAB.	Bagui, PHILIPPINE.

This is the European name of the frightful equinoctial gales which vex sea and land about the tropics in the Eastern seas, and down as far as to 10° from the equator. The whole Malayan Archipelago is excluded from their sphere, while the whole of the Philippine is within it, the island of Mindano alone excepted.

U.

(8419) ULMACEÆ, *Elmworts*, a natural order of Exogenous Plants. The flowers are hermaphrodite or polygamous, never in catkins; calyx divided, campanulate, inferior, irregular; stamens definite, inserted into the base of the calyx, erect in æstivation; ovary superior, 2-celled ovules solitary, pendulous; stigmas 2, distinct. Fruit 1-2-celled, indehiscent, membranous or drupaceous. Seed solitary, pendulous; albumen none, or in very small quantity; embryo straight or curved, with foliaceous cotyledons and superior radicle. (Lindley.) This order consists of trees or shrubs, which have scabrous alternate simple deciduous leaves and stipules. The genera belonging to it are *Planera*, *Abelicea*, *Ulmus*, *Celtis*, *Sponia*, and *Mertensia*. The species are natives of the north of Asia, the mountains of India, of north America, China, and Europe. This order is by most botanists made a section of the natural order *Urticaceæ*. It was however separated by Mirbel, and he has been followed by Lindley. They differ from *Urticaceæ* in the possession of a 2-celled fruit and hermaphrodite flowers. In all other respects they resemble *Urticaceæ*, and their affinities are the same. [URTICACEÆ]

Most of the species of this order are trees, the timber of which is often very valuable. The bark of the Elm is used as medicine. [ULMUS.] The genera *Planera* and *Celtis*, like the Elm, have species which are handsome ornamental trees, and yield useful timber.—*Eng. Cyc.*

(8420) ULMUS, a genus of Plants, the type of the natural order *Ulmaceæ*. The flowers are small and the leaves are alternate. In most of the species the flowers appear earlier than the eaves; they are disposed in groups, and seated on short peduncles. The calyx is of a reddish co-our, distinct from the ovary, imbricated in æstivation, with 4-8 segments, which remain until he fruit falls. The stamens are as numerous as he segments, and are inserted opposite to them. The ovary is elliptical, compressed, cloven at the ummit, 2-celled, and 1 ovule in each cell. The ruit is a samara, the wing-like appendage being broad and present all round, except in a notch. Only one of the cells of the ovary develops its eed, so that the fruit is 1-seeded. The embryo as no albumen, and its radicle is straight and ppermost. The leaves are stalked, and un-qual at the base, serrated, and generally rough o the touch; the axil of the primary nerves eneath are tufted with fine hairy filaments. The arious species of elm are wild in Europe, North America, India and China. Nearly 20 species ave been enumerated by various writers, but it is not at all certain that these are true species. This uncertainty arises from the fact which is now generally recognised by the cultivators of he elm, that the seeds of the elm do not produce lants precisely like their parents, and that the mount of difference in the elm is greater than mongst most other species of trees. It is on his account that there are so many recorded arieties of the species which are cultivated for ornament or timber.

(8421) ULMUS ALTERNIFOLIUS AND U. NTEGRIFOLIUS

Thalai, BURM.

Two of the largest trees in the Pegu province; hey are found about towns and villages in the rome district, but not below that latitude. The nus to which family the trees in question belong ford valuable timber,—red-colored wood, strong nd adapted for house-building.—*McClelland.*

(8422) ULMUS INTEGRIFOLIUS.

Tambachi marum, also
Ayah marum, TAM.
Nullee, TEL.

A large timber tree, a native of Circar moun-ains, it flowers during the cold season, leaves eciduous about the close of the wet season, they ome out again in March. The wood of this tree reckoned of a good quality by natives and is em-loyed for a variety of uses (*Rox*)—*Rohde M.S.S* large sized tree, wood reddish coloured, good r general purposes—said to yield to boiling ater a peculiar odour, which when mixed with mmon arrack gives it the flavour of the more pensive palmira arrack and enables the venders obtain better prices for their adulterated ticle.

(8423) ULTRAMARINE.

Bleu d'outremer, FR.
Ultramarin, GER.
Oltramarino, IT.
Ultramarin, RUS.
Ultramar, SP.
Lajvurd, GUZ. HIND.

A very fine blue powder, made from the *Lapis Lazuli* (*Guz. Hind.* Lajvurd-ka puttur) and highly prized by painters. Owing to the dearness of the *Lapis Lazuli*, this pigment is now artificially imitated in various ways.—*Faulkner.*

(8424) UMBELLIFERÆ, a natural order of Exogenous Plants. This is one of the best marked families of plants, so much so, that Jussieu says the whole order may be looked upon as a genus, and the various sub-divisions and genera as arrangements of the species. All the species are well marked, and have good distinguishing characters, and their inflorescence is always that of the umbel. The possession of an umbel was early made the combining character of this plant by systematic botanists, and they were called *Umbellatæ* on this account. In addition to this distinguishing character, they have also others, as the possession of 5 stamens and 2 stigmas, by which they were all brought under the class *Pentandria* and order *Digynia* of Linnæus. Most of the species are herbs, seldom shrubs, with fistular furrowed stems. The leaves are, in most cases, divided; sometimes they are simple; they are alternate, and all of them embrace or clasp the stem by a sheathing petiole. The flowers are white, pink, yellow, or blue, and are seated on umbels, which are either simple or compound, and these are with or without bracts at their base, which are called involucre, or involucellum, as they surround the umbels, or umbelules. The calyx is superior, either entire or 5-toothed. The petals are 5, and are inserted on the outside of a fleshy disc, which is placed on the top of the ovarium; they are usually inflexed at the point, and have an imbricate, rarely valvate æstivation. The stamens are 5, and are seated alternately with the petals, and are incurved during æstivation. The ovary is inferior, 2-celled, having solitary pendulous ovules, and is crowned by the disc, on which the petals are seated; the styles are two distinct, with simple stigmas. The fruit, which is ordinarily called the seed, consists of 2 carpels, which are united by a common axis, the part by which they unite being called the commissure; the external part of each carpel is traversed by elevated ridges, which are divided into primary and secondary; there are 5 of the latter, and 4, between them, of the former; the ridges are separated by channels, below which are often placed, in the covering of the fruit, little receptacles of coloured oily matter, which are called vittæ. The seed, which is pendulous, usually adheres to the sides of the cell of the fruit, and this has led to the confounding the seed and fruit together. The embryo is minute, and is seated in the midst of a horny albumen, with the radicle pointing to the hilum. The order agrees with *Ranunculaceæ* in its sheathing leaves, as well as its large albumen and its acrid properties. Other relations have been pointed out, as with *Saxifragaceæ*, *Geraniaceæ*, also with *Araliaceæ*, from which it differs little, except in the number of the parts of the flower. The following conspectus will show the sub-orders and tribes into which numerous genera of this order have been distributed by DeCandolle :—

- Umbelliferæ.
  - Sub-Order I. *Orthospermeæ.*—Albumen of seed flat on inner surface, neither involute nor convolute.
    - Hydrocotyleæ.
    - Mulineæ,
    - Saniculeæ.
    - Ammineæ.
    - Seselineæ.
    - Angeliceæ.
    - Peucedaneæ.
    - Tordylineæ.
    - Silerineæ.
    - Cumineæ.
    - Thapsieæ.
    - Daucineæ.
  - Sub Order II. *Campylospermeæ.*—Albumen rolled inwards at the edges.
    - Elæoselineæ.
    - Caucalineæ.
    - Scandicineæ.
    - Smyrneæ.
  - Sub-Order III. *Cœlospermeæ,*—Albumen curved inwards from base to apex.
    - Coriandreæ.

Tausch has more recently proposed another arrangement, and objected to the albumen being made the basis of the primary divisions of the order. The genera include above 1000 species These are principally inhabitants of the northern temperate zone, and the greater number of them are found in the Old World. The proportion of species in the southern half of the world, compared with the northern, is as one to four; that of the New to the Old World, as one to three. Very few of the species are found in the tropics, and about 50 are enumerated as inhabitants of Australia, The properties of this order are variable, and very important. One of distinguishing characters of the order is the possession of an acrid principle which finds its development in such plants as the Hemlock [CONIUM], *Œnanthe*, *Helosciadium*, *Æthusa*, &c. This renders the whole order suspicious, more especially, the vegetation, in which the poisonous principle is most developed· The acrid properties of these plants seem to depend upon the possession of a peculiar principle, which in as far as it has been examined in some of the species possesses alkaline properties. This is the case with Conia, a principle obtained from the Hemlock [CONIUM] which has been examined with the most care, although other plants of the order have been found to yield similar principles, but not possessing so much activity. Conia is remarkable amongst the vegetable alkaloids, for being fluid, volatile, and easily decomposed ; and it is probable that most plants whose poisonous properties are dissipated by heat possess a principle of a similar nature. In this respect there is also another analogy between the *Umbelliferæ* and *Ranunculaceæ*, the poisonous qualities of the species of the last order being in a great measure annihilated by heat. It is not inprobable that all the *Umbelliferæ* may possess a principle similar in nature though not in intensity, to the Conia, and that it may contribute in some measure to render such plants as the parsley, samphire, and celery desirable as articles of diet. Another important secretion of the *Umbellifer* is a volatile oil This secretion is found in all the species, with the exception of *Conium*, deposited in the canals of the pericarp, which are called vittæ. In some of the species it is more abundant than in others ; and on this account the fruit, which is commonly called the seeds, is used frequently in diet as a condiment, and in medicine as an aromatic and carminative. Of these the carraway, the anise, the dill, the cumin, and coriander are best known. A third secretion of these plants is a gum-resin. This probably, like the last two secretions, is common to the whole order but is fully developed in only a few species. The gum-resins produced by this order have had a great reputation in medicine, and many of them are still looked on as valuable remedies. The Laser, or Silphion, of the ancients, is secreted by plants belonging to this order, and assafœtida galbanum, gum-ammoniacum, oppoponax, and sagapenum are much used as stimulant medicines in nervous diseases at the present day. Many of the species when wounded exude in small quantities a gum-resinous matter. A fourth secretion, which also on account of its occasional excess renders this order important to man, is starch. This secretion, which forms so large a portion of the food of animals, is deposited in largest quantities in the roots of the carrot, the parsnep, the skirret, and the artacacha of the South Americans, and on this account these plants are extensively cultivated. Most of the roots however contain this principle, and might be used as articles of diet, but they also contain the poisonous principle of which we have before spoken.

Heat will dissipate this, and some of the roots which are deadly poisonous when raw, it is said, may be eaten with impunity when cooked. The roots of some of these plants resemble that of the horse-radish, and in winter, when the leaves are gone, may be dug up in mistake for it. Fatal consequences have in some cases ensued from such a mistake. Many of the *Umbelliferæ* are much affected in their secretions by climate and cultivation. Thus, the deadly hemlock in Russia is an inert and eatable plant, while the celery of English gardens, if cast on the roadside, becomes, an active poison. The properties of all plants are more or less affected by climate and cultivation ; but it is much more obvious where poisonous secretions are increased or diminished, as in the hemlock, or changed, as in the case of the celery. *Jussieu, Dict. des Sciences Naturelles* ;

Lindley, *Vegetable Kindom*; Don; Hiller, *Dictionary*; Burnett *Outlines*; Christison, *Dispensatory* Bischoff, *Lehrbuch der Bolanik.*) *Eng. Cyc.*

(8425) UMBER, an Ore of Iron and Manganese, employed as a brown pigment. It occurs massive, amorphous. Structure earthy. Fracture conchoidal. Soft. Opaque. Dull. Meagre to the touch; adheres strongly to the tongue, and falls to pieces in water. Colour blackish, reddish, or yellowish-brown. Specific gravity 2.206. It occurs in beds with brown jasper, in the Isle of Cyprus. It consists of iron, manganese, silica, alumina, and water.

(8426) UMBRELLAS.

Parapluie, Fr.
Chutree, Guz. Hind.
Kettisols (paper umbrellas), Chin.

Are well-known articles, employed as a covering against the heat of the sun and rain; a smaller kind, the *parasol* being used chiefly by ladies either while walking, or riding in open conveyances. The *kettisol*, or paper summer head, is extensively manufactured in China, whence it is largely exported to various parts of the world.—*Faulkner.* The Umbrella of the Lepcha in Sikkim consists of a frame work of Bamboo enclosing broad leaves of Phrynium.—*Hooker, Vol.* I, *page* 131. Umbrella, in Malay and Javanese, "paying," and in the latter, also, "songsong." To use an umbrella at all, amongst Malays, or rather to have it carried over one, for no native carries an umbrella himself, is a mark of rank and its quality implies the degree of that rank. The sovereign alone uses one which is gilt throughout. In Java, a small umbrella, called a "bawat," is the special badge of the higher nobility, called by the Sanscrit title of bopati. This is not made use of to screen from sun or rain, but carried by a retainer before the party. —*Crawfurd Dict. p.* 442.

(8427) UNCARIA a genus of Plants belonging to the natural order *Rubiaceæ. Uncaria* is sometimes considered only as a sub-genus of *Nauclea.* The flowers are aggregate on a globular receptacle; calyx tubularly urceolate, 5-cleft; corolla funnel-shaped, with a slender tube and naked throat; stamens 5; ovary 2-celled; capsules pedicellate, clavate, attenuated at the base: seeds imbricated, winged; embryo inverse and furnished with a perisperm. The species are chiefly natives of India, but a few are found in America. They are permanent cirriferous ramblers, hanging to different trees by the hooked old peduncles.

(8428) UNCARIA GAMBIER, Roxburgh, the Gambier Plant, is a native of Penang, Sumatra Malacca, &c, The substance called Gambier by the Malays is prepared from it, and it is known in commmerce by the names of *Terra japonica* and Catechu.

This plant was first described by Rumphius, 'Herb. Amb.,' v., p. 63, t. 34, f. 2 and 3, by the name of *Funis uncatus angustifolius*, but the process of preparing the extract was first fully described by Dr. C. Campbell, one of the early medical officers of the station of Bencoolen who paid considerable attention to the useful plants of the neighbourhood. He states that it is chewed by the Malays mingled with betel-leaf and areca-nut in the same way that catechu is used on the continent of India, and was solicitous that a trial should be made of its power in tanning. The preparation he describes as simple:—"The young shoot and leaves are shred and bruised in water for some hours, until a feculum is deposited; this inspissated in the sun to the consistence of a paste, is thrown into moulds of a circular form and in this state the gambier is brought to market."—*Eng. Cyc.*

(8429) UNGKA-ETAM, the Asiatic name for *Hylobates Rafflesii*, Geoffroy. [HYLOBATES.]

(3430) UNGKA-PUTI, an Asiatic name for *Hylobates agilis.* [HYLOBATES]

(8431) UNGUICULATA. Linnæus divided the *Mammalia* into the following sections: —*Unguiculata, Ungulata*, and *Mutica.*

(8432) UNKOODOO. NAUCLEA GAMBIER. Hunter.

Unkoodoo kurra, TEL.
Gambier, MALAY.

This is a substance which is sometimes though rarely brought from Malay countries to the Coromandel coast. The Malays chew it with the betel-leaf, as the Indians do the areca-nut. It is prepared from the leaves of the shrub and somewhat resembles catechu. Its taste is exceedingly astringent.—*Ainslie's Mat. Med. p.* 264. The water extract of *Nauclea Gambir*, forms a good leather of a red or orange colour.

(8433) UNONA, a genus belonging to the natural order *Anonaceæ*, so called from 'unus' one, the stamens being united with the germens, The generic character is, slpals 3; petals 6, the 3 inner the smallest; stamens numerous; carpels numerous, one or many celled; seeds in a single row. The species consist of trees, large shrubs or climbing plants, found in hot parts of the world, as India and its islands, Africa, and south America. The bark and fruit of many of the species are aromatic, with some degree of acridity, and are employed as stimulating medicines or as condiments.—*Eng. Cyc.*

(8434) UNONA MUSARIA has been so called from its bark being used for making musical instruments, as is indeed also that of another species. This is a rambling shrub, a native of Amboyna, &c., the roots and bark are also used medicinally. *U. tripetala, U. uncinata. U. odorata*, &c., natives of the Indian islands, are remarkable for the sweet scent of their flowers. *U. esculenta*, a native of the Indian peninsula, has fruit which is edible. Some species, as *U. sylvatica*, are valued for their timber. *U. longifolia* is an elegant tree, with smooth, pointed, and undulate leaves, which is much cultivated in some parts of India to form avenues and to afford shade. It is sometimes called Deodara, which is properly the name of the celebrated Himalayan Pine, *Pinus* or *Cedrus Deodara*.—*Eng. Cyc.*

(8435) UNONA NARUM is one of the climbing species, a native of Malabar, which Rheede describes as possessed of medicinal properties, the roots being so used, as well as the sweet-scented greenish-coloured oil obtained from them by distillations.—*Eng. Cyc.* In Malabar, a greenish sweet smelling oil is obtained, by distillation, from the roots of *Unona Narum*, an evergreen climber which is used medicinally as a stimulant.—*Simmonds.*

(8436) UPAS ANTIAR. ANTIARIS TOXICARIA (Leschenault) Ipo toxicaria, *Pers.*

Upas tree, ENG. | Anchar, MALAY.

A native of Java. The juice of this tree is one source of the half fabulous Upas poison. The tree is often over 100 feet in height, its bark pale and smooth, its leaves oval, coriaceous, hairy, juice viscous, bitter, white or yellow, flowing abundantly from incisions, and concreting into a gummy resinous mass. The *Upas antiar* poison is prepared in an earthen vessel with this juice, which is mixed with the seed of the Capsicum frutescens, and various aromatics. This poison at first acts as a purgative and emetic, then as a narcotic, causing death by violent fits of tetanic convulsions. The *Upas tiente* poison is prepared from a strychnos, and differs from this substance.—*O'Shaughnessy, page* 579. Upas, in Javanese, "poison," or "venom," is the sap of some plants of the Malay and Philippine Islands yielding poisonous juices, which, by concentration, produce a poison of considerable activity which has been sometime employed by the ruder natives to render their weapons deadly. The most potent of these plants in Java are the Anchar, the Antiaris toxicaria, a large forest tree and the Cheteak, Strychnos tiente, a climbing shrub. In all these cases, the poison, even when fresh, is far less active than that of the cobra snake, for the most powerful will take an hour to kill a dog, which the venom of the hooded snake would certainly accomplish in half the time. To effect a fatal purpose, too, it is necessary that the poisoned weapon should be left in the wound and not withdrawn, so that the probability is that few human beings have ever lost their lives by means of these poisons.—*Crawfurd, Dictionary page* 442. The Upas Tree, Antiaris toxicaria, is a poisonous tree grown in Java, in a valley filled with Carbonic acid, highly dangerous therefore to enter.—*O'Shaughnessy.*

(8437) UPUCUTI.

Upucuti, MAL.

Upucuti is the Malabar name of a bush common in Malayalum. It contains a juice which is very tenacious and is used by the Natives for sealing their letters.—*Ains. Mat. Med. page* 204.

(8438) UPUPIDÆ, a family of Insessorial or Perching Birds. Linnæus placed the genus *Upupa* between *Merops* and *Certhia* [CERTHIADÆ], among his *Picæ*, in his last edition of the 'Systema Naturæ:' the species of *Upupa* recorded by him are *U. epops*, *U. promerops*, and *U. paradisea.*—*Eng. Cyc.*

(8439) UPUPA EPOPS, the Hoopoe. This is the Ἔποψ of the Greeks (Aristotle, 'Hist. Anim.,' i. 1; ix. 11; ix. 15. 49; Aristophanes, 'Birds,' 228, et seq.; Pausanias, x. 4); Upupa and Epops of the Romans (Pliny, 'Nat. Hist.' x. 29; xxx. 6; Ovid, 'Metam.,' vi.). In Ovid's lines descriptive of the transformation of Tereus, the bird is drawn to the life :—

> " *Tereus*, through grief, and haste to be reveng'd,
> Shares the like fate, and to a bird is chang'd.
> Fix'd on his head the crested plumes appear,
> Long is his beak, and sharpen'd as a spear."—*Crexall.*

Two parallel rows of long feathers form an arched crest upon the head; these feathers are of a ruddy buff colour, terminated with black; This bird is found as far north in the summer as Denmark, Sweden, and Russia: and southward in continental Europe, in Germany, Holland, France, Spain, and Italy. It has been seen both at Gibraltar, Ceuta, and in Eygpt (where it breeds): it is probably an inhabitant of the whole of North Africa. It has been also observed at Madeira, and at Trebizond, in Asia Minor, from which last locality it has been sent to England and it is abunbant in India.—*Eng. Cyc.*

(8440) *Epimachus*, Cuv. Bill resembling that of *Promerops*, but the margins are obtuse and somewhat inflected; wings, tongue, and feet unknown; tail very long; side-feathers of the body greatly developed.

(8441) *Epimachus magnus* (*Upupa magna*, Gm., *U. superba*. Lath.). Body generally black or brownish-black; tail graduated, thrice as long as the body (Lesson says three feet in length, French); feathers of the sides elongated, raised, curled, glittering on their edges with steel-blue, azure. and emerald-green, like precious stones; the head and the belly lustrous also with steel-blue, &c. In truth, language fails to convey any just idea of the magnificence of this species. It inhabits the coasts of New Guinea.—*Eng. Cyc.*

(8442) URANIA, a genus of Plants belonging to the natural order *Musaceæ* The name which the plant bears in Madagascar is Ravenala. This genus has but one species, *U. speciosa*, which is a native of Madagascar. It has a superior coloured perianth, consisting of 3 petals; a 2-leaved nectary, and one of the leaves bifid; a 3-celled many-seeded capsule, and the seeds in two rows covered with an aril. The flowers are arranged upon a spadix, which are nodding, very similar to the bananas which belong to the same family. The leaves are arranged in a fan-shape. The seeds of this plant are said to constitute a wholesome food.—*Eng. Cyc.*

(8443) URANIA SPECIOSA. MUSACEÆ. HANDSOME URANIA. The yard of a Burmese merchant in Tavoy, is often visited by Europeans to look at what is deemed the most curious tree in the Provinces. It is frequently amusing to listen to the observations of the spectators that may not unfrequently be seen gathered around it on a fine evening. "It is a kind of a palm," says one, "do you not see that its trunk is precisely that of a palm?" This settles the question so long as the eyes are kept on the trunk; but another looks up and cries out, "No such thing! Look at its leaves. They cannot be distinguished from the leaves of a plantain tree." It belongs to the natural family of the plantain, but it has the trunk of a palm, and the leaves are not arranged around the stem like those of the plantain, but in two opposite rows, so that the whole head has the form of a gigantic fan. It is the only tree of the species that Mr. Mason has seen on the Coast, and it was brought up by its owner from Penang. It is well worthy of cultivation for a curiosity.—*Mason.* The Plantain Leafed Palm is an elegant tree, a native of Madagascar: spreads its leaves out like an open fan, forming a semicircular head. It has a short solid trunk, with leaves like a plantain; and in a border, or at the end of a walk, when growing, forms a perfect screen: its peculiar appearance strikes a person immediately when seen for the first time. It bears a small fruit like the drupe of a plantain, which is of a blueish colour. Roxburgh says—"The plant has the property of rendering water or milk, either hot or cold, mucilaginous, without altering the taste, colour, or smell, of the liquid in its former state." Butter-milk and water is often thickened with the juice of this plant and then sold as an unadulterated article of the richest and best description. Is propagated by seed and suckers. Fifteen feet space should be allowed between each tree.—*Riddell.*

(8444) URCEOLA. A genus of Plants belonging to the natural order *Apocynaceæ*, so named by Dr. Roxburgh from urceolus, 'a pitcher,' in consequence of the form of its corolla. The genus *Urceola* is confined to the Malayan peninsula and the islands of Sumatra and Penang; but as it is by some botanists considered not to differ from the *Vahea* of Madagascar, the genus may have a wider distribution. It has the calyx small, 5-partite. Corolla urceolate; tube elongated, ventricose, 5 cleft. Stamens 5, anthers sagittate. Follicles 2; numerous, glabrous.—*Eng. Cyc.*

(8445) URCEOLA ELASTICA, or Caoutchouc Vine, is shrubby and twining, climbing over trees to a great extent, sometimes as much as 200 paces; with oval opposite leaves, and terminal panicles. From wounds made in the bark of this plant there oozes out a milky fluid, which on exposure to the open air separates into an elastic coagulum, and watery liquid apparently of no use. After the separation takes place. This coagulum is not only like American Caoutchouc, or Indian-Rubber, but possesses all the same properties as first ascertained by Dr. Roxburgh ('Asiat. Res,' v. 171.) He states that a ball of it externally has the appearance of American Caoutchouc; when cut into, it is of a light brown colour, till the action of the air darkens it. This ball, measuring 9½ inches in circumference, and weighing 7¼ ounces in simply falling from a height of 15 feet, rebounded about 10 or 12 times, which is of itself an indication of the goodness of the Caoutchouc. Dr. Roxburgh also found that slips of it were capable of bearing a greater degree of extension and contraction than the American. When they broke, the elasticity was so great, that each end returned to its respective mass. The least pressure with the finger and thumb united different portions as perfectly as if they had never been separated: this property of Caoutchouc has been considered a much more modern discovery. [INDIAN RUBBER.]—*Eng. Cyc.* A plant grows in the forests, east of Chittagong, the milk of which flows in a continuous stream resembling caoutchouc (it is probably the *Urceola elastica*, which yields Indian-rubber.)—*Hooker. Him. Jour. Vol.* II. *page* 350. *Urceola Elastica.* Roxb. As. Res. v. 169. Sumatra and Pulo Penang. A large woody climber, yields caoutchouc of the finest quality, in great abundance.—*O'Shaughnessy, page* 449.

(8446) URENA, a genus of Plants belonging to the natural order *Malvaceæ*. Like other Malvaceous plants, the species of *Urena* abound in strong and serviceable flax-like fibres, which are well fitted for conversion into cordage. *U. lobata* and *U. sinuata* are specially mentioned as employed for this purpose in India.—*Eng. Cyc.*

(8447) URENA LOBATA. URENA HEMP.

Bun-ochra, BENG. HIND.

This weed, which abounds all over the Tenasserim Coast, serves in the place of hemp in Amherst Province and appears to afford a valuable article.—*Mason.*

(8448) URENA LOBATA. BUN-OCHRA.

Wet-khyœ-pa-nai, also, Kat-sai-nai, BURM.'

A weed, common in most parts of India, abounds in a strong fibre, which is a tolerably fine substitute for flax. The Urena lobata abounds along the coast of province Amherst; and affords a valuable hemp.—*Mason.*

This *Fibrous Plant* is also an annual, flowering in December, but though in other respects resembling *Triumfetta*, the flower is of a light pinkish colour, and the capsules are a little larger than those of Triumfetta lobata and differ still more in their presenting from three to five grooves, marking the detriscence, or the number of valves or parts of which the capsule is composed; but in other respects the two plants appear alike to ordinary observation, and alike also as to the value of their fibre. They are both generally found growing together, and are two of the most plentiful weeds which are to be found in Pegu. They take possession of all ground recently cleared of tree jungle about Rangoon, and extend without interruption to the Pegu and Tounghoo districts, but become scarce or only occasionally met with in the Prome and Tharawaddy districts. —*McClelland.* Both of the above are common in most parts of India, the bark yields a strong and tolerably fine substitute for flax. Roxb. III. 182.—*Rhode M. S. S.*

(8449) URENA SINUATA.

Uren, Rheede.
Palia mankena, Tel.
Kungia, Hind.
Kangooga, Beng. and Hind.

A weed common in most parts of India; abounds in strong fibre, a tolerably fine substitute for flox —*Royle.*

(8450) URGUJJA, a yellowish coloured perfume, made of several scented ingredients, sandal wood, wood aloes, rose water, atter of roses, civet cat perfume, and oil of Jessamine. -*Herklots.*

(8451) URJUNA BARK. A stringent bark of Terminalia alata.—*Beng. Ph. p.* 229.

(8452) URTICA (from 'uro'), a genus of Plants known under the common name of Nettle. Nettle is the same word as the anglo-Saxon 'netel' or 'nædl,' a needle, which is applied to these plants on account of their possessing small bristles or prickles which have a stinging property. This genus is the type of the natural order *Urticaceæ.* The flowers are either monœcious or diœcious. The staminiferous flowers have a single perianth of 4 leaves, containing the rudiment of a pistil. The pistilliferous flowers have a single perianth of 2 leaves; a sessile stigma, and a dry fruit containing a single seed. Most of the species are herbaceous plants or under shrubs, and are found in Europe, Asia, and America. Three of the species, of which there are about 40, are British. The woody fibres of other species of *Urtica* are employed in making linen. The *U.* (*Bochemeria*) *nivea* yields a remarkable fine fibre, with which delicate fabrics are made in India —*Eng. Cyc.*

On the island of Chusan, there is a species of Urtica. Both wild and cultivated, which grows about three or four feet in height, and produces a strong fibre in the bark, which is prepared by the natives and sold for the purpose of making ropes and cables.—*Fortune.*

(8453) URTICA ARGENTEA, a nettle of the Society Islands, the fibres of which are converted into cord: and of U. Japonica in Japan, its bark is made into lines, cordage and cloth. See "China Grass, Caloee."

(8454) URTICA CRENULATA. Roxb. Chou Putta, or Surat, a gigantic stinging nettle, a native of the hills and valleys on the east of Bengal; Luckipore, Pundua Hills and Assam. This nettle affords a quantity of fine white fibre of great strength, and not durable. The Hill tribes fabricate it into coarse cloths —*Royle Fib. Pl.* It grows in the Calcutta Botanic Gardens, it stings so terribly that it has sometimes occasioned very formidable sypmtoms. Another urtica, the *Daoun setan*, or demon nettle of Timor, is still more dangerous in its effects.—*O'Shaughnessy, page* 578. Where the ground is swampy, dwarf *Bandanus* abounds, with the gigantic nettle, *Urtica crenulata* ("Mealeem-ma" of Sikkim,) —*Hooker. Him. Jour. Vol* II *p.* 339. This plant is a native of the hills and valleys on the east of Bengal. Dr. Roxburgh obtained it first near Luckipore. It has since been found near the Pundua Hills. Major Hannay enumerates it among the fibrous plants of Assam. It has an erect shrubby stem, with oblong acute leaves, having the margins crenulate or slightly dentate, both sides alike, the bark armed with acute burning hairs. The sting produces great pain, extending to the armpit; abates after two or three days, but does not disappear entirely for nine days. Major Hannay says of this and another, which he enumerates as Nos. 3 and 4, and calls gigantic stinging Nettles, that they afford a quantity of fine white fibre, but apparently of no great strength, and, by report, not very lasting. Some of the Hill tribes use the fibre for fabricating coarse cloths.—*Royle Fb. Pl. p.* 66.

(8455) URTICA HETFROPHYLLA. Neilgherry nettles, Horoo Surat at Assam.

Herpha or Serpah, Bhootea.
Theng Mah, Chin.

Is the most widely diffused of the large Indian Nettles, being found in south Concan, along the Malabar Coast; the Mysore, the Neilgherries the valleys of the Himalayas; in Assam, and Burmah: It is an annual plant, the sting of which produces intense pain. The bark abounds in fine, white, glossy silk like fibres, but these probably differ with the locality in which the plant is grown, Dr. Wight describes that of the Neilgherries, as a fine soft flax like fibre, and fitted to compete with flax for the manufacture of even very fine textile fabrics. The Todavers extract it by boiling the plant, and use it as a material for making thread. Mr. Dickson passed it through his machine and liquid, which rendered it like a beautiful, soft, silky kind of flax. He calls it a wonderful fibre, of which the two would be useful for mixing with wool, as has been done with the China grass.

The *Horoo Surat* of Assam, said to he the *Urtica heterophylla* of Dr. Roxburgh, is the most widely diffused of the large Indian Nettles, inasmuch as it is found in the Southern Concan, on the Malabar coast, and specimens of fibre of what was called *Neilgherry Nettle*, produced by *Urtica heterophylla.* were sent by Dr. Wight to the Exhibition of 1851. It is also found in Burmah and in Assam ; and along the foot of the hills extends to the Deyra Doon. It may be seen even in the northern valleys of the Himalayas. It is an annual, with erect angular stems, marked with small white specks, in which are inserted stiff, most acute bristles. The leaves are long, petioled, caudate at the base, variously lobed, and towards the top of the plant almost palmate ; all are grossly serrate, armed with the same bristles as the stem and branches, from four to eight inches ong and nearly as broad. Dr. Roxburgh says of it, that it is the most ferocious looking plant he has seen, and it acts up to its appearance : the least touch of any part producng most acute pain, but fortunately of short duration. The bark abounds in fine, white, glossy, silk like, strong fibre. Major Hannay says of it, that it is the *Horoo Surat* of the Assamese, and known to the Bhoteeas as the *Serpah* or *Herpah*,—that the fibre is extensively used by them in the manufacture of cloth. It was recognized by the Chinese as the *Theng Mah*, and said to be prized for the softness of its fibre, as well as for its strength. As the seeds are quick of vegetation, the cultivation of this plant, can be carried to any extent. The fibre of this Nettle, sent from the Neilgherries, is very long soft, white, and silky, and has been much admired by many of the best judges of fibres. The pecimens were sent by Dr. Wight, and prepared in a rude way by boiling by the Todawars of he Neilgherry Mountains. Dr. Wight says of t, that " it produces a beautifully fine and soft lax-like fibre, which the Todawars use as a thread material, and if well prepared itted to compete with Flax for the manuacture of very fine textile fabrics." This fibre could of course be equally well prepared n a multitude of other places, some near, others distant from the sea. Mr Marshall did not consider it well suited for his purpose. At Dundee, it was thought a very good fibre, but rather dry. Mr. Dickson, who has passed it hrough his machine and liquid, has rendered it ike a beautiful, soft, silky kind of Flax, and calls it a wonderful fibre, of which the tow would be useful for mixing with wool, as has been done with the China-grass, and the fibre used for the inest purposes. If this should be proved to be he case on trial, it might no doubt be produced abundantly, and, with some improved process of separation, very cheaply, at easily accessible places on the Western Coast of the Indian Pennsula.—*Royle Fib. Plants, p.* 67.

The *Fibre of the Neilgherry Nettle* is supposed o be still unknown in commerce. As yet it is only obtainable in small quantity, but if called for the supply might be largely increased as the plant is abundant and widely distributed over the Indian Peninsula. It is separated by boiling the stalks.—*M C.C.* With regard to the strength of the Nettle fibres, it has already been stated that Dr. Roxburgh found the Rami or caloee bore 240 lb., when Hemp bore 158 lb., and sunn 150 lb v. Table, Messrs. Sharpe, in 1815, found a cord bore 252 lb., when Russian Hemp was only required to bear 82 lb.; So in Dr. Royle's experiments with these fibres in an untwisted state, Petersburgh Hemp bore only 160 lb., when China-grass bore 250 lb., the Rheea 320 lb., and the Wild Rheea 343 lb., Mr. Henley had previously found the Kunkhoora or Rheea to bear about three times the weight of Russian Hemp. The Urticaceæ is a family of plants which prefer localities where there is considerable moisture of soil or climate. They grow to a gigantic size in the hot moist parts of Asia, and extend from its warm tropical islands, all along the Malayan Peninsula, along the foot and in the vallies of the Himalayas, near to the Sutlege, many of the species and genera have long been famous for the tenacity of their fibre. See CHINA-GRASS : BOEHMERIA.—*Royle.*

(8456) URTICACEÆ. Some of the fibres in the Sikkim Himmalaya of the various nettles ; are twisted for bowstrings, others as thread for sewing and weaving ; while many are eaten raw and in soups especially the numerous little succulent species.—*Hooker. Him. Jour. Vol.* I. *p.* 293.

(8457)URTICA INTERRUPTA.URTICACEÆ. This Nettle, a large annual plant, grows during the rains. The whole plant is covered with stinging hairs, like the common nettle. It grows wild : there are several indigenous species. —*Riddell.*

(8458) URTICA NIVEA is abundantly grown in the western part of one province and in the adjoining province of Kiangse. Fabrics of various degrees of fineness are made from this fibre and sold in these provinces, but Fortune had not seen any so fine as that made about Canton : it is also spun into thread for sewing purposes, and is found to be very strong and durable. There are two very distinct varieties of this plant common in Chekiang—one the cultivated, the other the wild. The cultivated variety has larger leaves than the other ; on the upper side they are of a lighter green, and on the under they are much more downy. The stems also are lighter in colour, and the whole plant has a silky feel about it which the wild one wants. The wild variety grows plentifully on sloping banks, on city walls, and other old and ruinous buildings. It is not prized by the natives, who say its fibre is not so fine, and more broken and confused in its structure than the other kind. The cultivatad kind yields three crops a year. The last great crop which he observed was that of a species of juncus, the stems of which are woven into beautiful mats, used by the natives for sleeping upon, for covering the floors of rooms and for many other useful purposes. This is cultivated in water, somewhat like the rice-plant, and is therefore always planted in the lowest part of these valleys. At the time of his visit, in the beginning of July, the harvest of this crop had just commenced, and hundreds of the natives were busily employed in drying it. The river's banks, uncultivated land, the dry gravelly bed of the river, and every other available spot was taken up with this operation. At grey dawn of morning the sheaves or bundles were taken out of temporary sheds, erected for the purpose of keeping off the rain and dew, and shaken thinly over the surface of the ground. In the afternoon, before the sun had sunk very low in the horizon, it was gathered up again into sheaves and placed under cover for the night. A watch was then set in each of the sheds; for however quiet and harmless the people in these parts are, there is no lack of thieves who are very honest if they have no opportunity to steal. And so the process of winnowing went on day by day until the whole of the moisture was dried out of the reeds. They were then bound up firmly in round bundles, and either sold in the markets of the country, or taken to Ningpoo and other towns where the manufacture of mats is carried on on a large scale.—*Fortune.*

Hemp is cultivated in the provinces north of the Meiling, but the plant also grows in Fuhkien; the grasscloth made from it is not so much used for common dresses as cotton and silk. There are three Chinese plants which produce a fibre made into cloth known under this name, viz., the *Cannabis sativa* or hemp at Canton, the *Urtica nivea*, a species of nettle grown about Sucham, and the *Sida tiliæfolia* near Tientsinfu.—*Williams' Middle Kingdom, page* 106.

(8459) URTICA PULCHERRIMA. The Hill Nettle. Affords very fair samples of fibre. The plant from which this fibre is taken is deserving notice. It yields the latter long in staple and of considerable strength. On the Neilgherry Hills it is known and appreciated by both Todawers and Berghers.—*M. E. J. R.*

(8460) URTICA TENACISSIMA, like some of the other nettles, as well as the hop and the hemp, belonging to the same natural family, abounds in ligneous fibre, which may be converted into very strong cordage. This is the Caloee of Marsden, Rami of the Malays, a native of Sumatra, also of Rungpore, where it is called Kunkamis, and which Dr. Roxburgh found one of the strongest of all the vegetable fibres which he subjected to experiment. Nettle Hemp, viz., the *Urtica tenacissma*, Burmese "*Goun*" is diffused in the Neighbourhood of Ava.

It was cultivated for several years by Major Macfarquhar at Tavoy, who endeavoured to induce the natives to foster it, but it has not yet been brought into general culture. Colonel Burney said that the Burmese at Ava called it goun.—*Mason.*

(8461) URTICA VIRULENTA. a nettle occurring near Gurhwal and Simla abounding in fibre.

(8462) URTICACEÆ, *Nettles* or *Nettleworts*, a natural order of Plants. The plants belonging to this order are trees, shrubs, and herbs, yielding in some instances a milky juice. The leaves are alternate, and usually covered with asperities or with hairs furnished with a stinging secretion; the stipules are membranaceous, and are deciduous or convolute in vernation. The flowers are monœcious or diœcious, either scattered or collected together in catkins or in close heads. The calyx is membranous, lobed, or persistent. The stamens are definite in number, not united, and inserted into the calyx opposite its lobes; the anthers during æstivation are curved inwards, but are turned backwards with elasticity after bursting. The ovary is superior, containing a solitary erect or suspended ovule with a simple stigma. The fruit is either a simple indehiscent nut, surrounded by a membranous or fleshy calyx, as in *Boehmeria*; or it is a fleshy receptacle, either covered by numerous nuts lying among the persistent fleshy calyxes, as in *Dorsteina*, or the nuts are inclosed in the cavity of the receptacle, as in the Common Fig; or it may consist of a single nut covered by a succulent involucre. The embryo is straight, curved, or spiral sometimes without albumen; the cotyledons are flat, and the radicle points to the hilum. The order, as thus defined, includes several groups of plants which are frequently separated, as the *Artocarpeæ* of Robert Brown, the *Batideæ* of Martius, and the *Moreæ* of Endlicher. This order brings together plants growing all over the world, possessing very different properties, and yielding very various and useful products. The Stinging Nettles [Urtica] form the type of the order. To it belongs also the deadly Upas. [Antiaris.] The wholesome Fig, the celebrated Banyan, and species yielding deadly poisons belong to the genus *Ficus*. [Ficus.] The Bitter Hop [Humulus], the Acid Mulberry [Morus], and the Narcotic Hemp [Cannabis], and famous Cow-Tree [Cow-Tree], all belong here. The sap of many of the species, especially those belonging to the division *Artocarpeæ* is milky. [Artocarpaceæ; Moraceæ; Artocarpus; Bœhmeria; Dorstenia.]—*Eng. Cyc.*

(8463) USNEA, a genus of Plants belonging to the natural order of Lichens. The *Usnea* *plicata*, in common with the *Roccella tinctoria* and other Lichens, is used as a dye.—*Eng. Cyc.*

(8464) UVARIA GRANDIFLORA? UVARIA FRUIT. This fruit has the taste and appearance of the North America pawpaw, and they are members of the same natural family. It is the produce of a scandent shrub abounding in the Tenasserim jungles.—*Mason.*

(8465) UVARIA ODORATA. ANONACEÆ. Sweet scented Uvaria. A small tree, flowers white, delightfully fragrant, introduced from China. Native cottages on the Tenasserim Coast are often overshadowed by the sweet uvaria, whose yellow-green petals almost blend their colouring with that of the leaves.—*Mason.*

(8466) UVARIA TOMENTOSA. A tree, the fruit of which is about the size of a Nutmeg; flowers of purple colour, and hang in clusters.—*Riddell.*

V.

(8467) VACCINACEÆ, *Cranberries*, a natural order of Exogenous Plants. The species of this order are shrubby plants, with round irregularly angled stems and branches; simple entire alternate coriaceous leaves, with a solitary or racemose inflorescence. The calyx is superior and entire, or with 4, 5, or 6 lobes, sometimes deciduous. The corolla is monopetalous, and its lobes correspond to those of the calyx, and are alternated with them. The stamens are free, and are generally double the number of the lobes of the calyx, and are inserted into an epigynous disc; the anthers are terminal, 2-celled, bursting by pores, and furnished with two horns. The ovary is inferior, surrounded by the epigynous disc, 4-5-celled, with one or many seeds in each cell; the style and stigma are both simple. The seeds are very small, with a straight embryo in the midst of a fleshy albumen; the cotyledons are very short, and the radicle is long. This order is made by many botanists a section of *Ericaceæ*. It differs from *Ericaceæ* in possessing an inferior ovary and a succulent fruit. It was placed by Richard in *Escalloniaceæ*, but it differs from this order in being monopetalous.—*Eng. Cyc.*

(8468) VACCINIUM, a genus of plants, the type of the natural order *Vaccinaceæ*. This genus consists of shrubby plants with alternate membraneous leaves, often beset with resinous dots, and are either permanent or deciduous. The flowers are seated on pedicels, and are either solitary or arranged in simple racemes, generally drooping, without any odour, and tainted with various shades of red or pink. The calyx is 4-5 toothed; the corolla urceolate or campanulate, more or less deeply 4-5 cleft, with the limb reflexed; the stamens are 8 or 10 not attached to the corolla, with 2 horned anthers dehiscing at the summits, and sometimes furnished at the back with two spreading spurs or bristles; the style is longer than the stamens, and the stigma obtuse; the fruit is a berry, globose, depressed at the tope, 4- or 5-celled, many-seeded, of a black purple, bluish, or red colour, generally eatable though not always plessant or wholesome in an uncooked state. The genus consists of about 50 species, which are known by the common names of Bilberries, Whortleberries, Bleaberries, &c.—*Eng Cyc.* Dr. Wight in Icones gives Vaccinium, 1179; affine, 1190; arboreum, 1188; Donnianum, 1191; Dunalianum, 1194; Griffithianum, 1192; hirsutum, 1182; Leschenaultii, 1188; Malacca, 1186; Neilgherrense, 1189; obovatum. 1193; odontocerum, 1187; serpens, 1183; serratum, 1184-6; setigera, 1181 : venosum, 1185; verticillatum, 1181; Wallichianum, 1180.

(8469) VACHELLIA, a genus of Plants belonging to the natural order *Leguminosæ*. *V. Farnesiana*, a native of the East and West Indies, exudes from its bark a considerable quantity of gum. The flowers when distilled yield a delicious perfume.—*Eng. Cyc.*

(8470) VACHELLIA FARNESIANA. Mimosa Farnesiana, Roxburgh.)

Veda vully marin, TAM.
Jali mara, CAN.
Urimeda, SANS.
Gooya.babula, HIND.

Flowers very fragrant.—*O'Shaughnessy, page* 303. An armed shrub, very common in Mysore and Dekhan, exuding much gum like the babool, which it greatly resembles in its timber, the size is very small.—*M. E. J. R.*

This pretty, tall shrub is sometimes called gum arabic tree in Calcutta, though not the true gum arabic plant, it is a favourite with the natives on the Tenasserim Coast, and it grows rapidly from seeds. The flowers are deep yellow, small, in globular heads, like the mimosa, and powerfully fragrant.—*Mason.* The true gum-arabic tree is not in the Tenasserim Provinces, but the vachellia-tree produces a gum with all the properties of the gum-arabic of commerce; and the cashew-tree, which grows all over the Provinces, "annually exudes," says Voigt, "from 5—12 pound weight, of a fine white transparent gum, like gum arabic, and not inferior to it in virtue or quality." —*Mason.* The wood is deficient in size. in other respects good.—*Rohde.*

(8471) VAGHEY, the Tamil name of a Ceylon tree which grows to about twelve inches in diameter. It is a strong wood, and is used by the natives for wheels of carts, &c.—*Edye Ceylon.*

(8472) VAHEA GUMMIFERA, of Madagascar, yields caoutchouc.—*O'Shaughnessy, page* 449.

(8473) VALERIANA, a genus of plants, the type of the natural order *Valerianaceæ*. The species of this genus are herbs or undershrubs, with very variable leaves, and mostly reddish-white corymbose flowers. The limb of the calyx is involute during flowering, but it at last unfolds itself in the form of a feathery pappus, which is seated on the inferior ovary; the corolla is infundibuliform, gibbous at the base, and 5-cleft; the stamens are 3, and the fruit is indehiscent, 1-celled, and 1-seeded. This genus presents many diversities of form, although its species are obviously closely related.—*Eng. Cyc.* Wight gives Valeriana Arnottiana, 1045-6: Brunoniana, 1045; *Hookeriana*, 1045; and Leschenaultii, 1044.

(8474) VALERIANA JATAMANSI. INDIAN VALERIAN.

Balchur. HIND.

Valeriana Jatamansi, the Jatamansi valerian of the Himalayas is an efficient substitute for the European article, and is a very useful stimulant and antispasmodic remedy chiefly employed in hysteric cases. Dose, one to two ounces three times daily.—*Beng. Phar. p.* 305. See SPIKENARD; also NARDOSTACHYS.

(8475) VALERIANACEÆ, Valerian Worts, a natural order of Exogenous Plants, belonging to Lindley's Aggregose group of Monopetalous Exogens. The order is composed of annual or perennial herbs or undershrubs with opposite stipulate leaves. All the perennial species have roots more or less strongly scented, the annual are mostly inodorous. The flowers are either corymbose, panicled, or in heads, sometimes changing from one form into the other; the calyx is superior, the limb either membranous or forming a feathery pappus; the corolla is tubular 3-6-lobed regular or irregular and sometimes spurred at the base; the stamens vary in number from 1 to 5 and are inserted into the tube of the corolla alternately with its lobes; the ovary is inferior and 1-celled, with sometimes 2 imperfected and aborted cells, the ovule is solitary and pendulous: the style simple and from 1 to 3 stigmas; the embryos straight and without albumen with a superior radicle. These plants are most nearly allied to Dipsaceæ from which they are distinguished by their looser inflorescence, sensible properties, want of Albumen and the absence of an involucellum. They are remotely related to Rubiaceæ. They are natives of temperate climates or elevated positions in both the Old and new World. They are more abundant in the North of Asia, Europe and South America than in Africa or North America. Valerianella; Spikenard. Nardostachys.—*Eng. Cyc. page* 1179.

(8476) VALLARIS, a genus of Plants belonging to the natural order *Apocynaceæ*. The species consist of a few twining shrubs, which are found in China, the Indian Islands, and the plains of India. Of these *V. Pergulana*, called *Echites hircosa* by Roxburgh, and common in the Indian Peninsula and Archipelago, is remarkable for its offensive goat-like smell; while *V. dichotoma*, indigenous in the North-Western Provinces, is remarkable for its agreeable odour. Its leaves are employed there as poultices.—*Eng. Cyc.* Wight gives, Vallaris dichotoma, 438; and Pergularia, 429.

(8477) VALLEY, LILY OF THE, a common name for the *Convallaria majalis*. The genus *Convallaria* has a bell-shaped 6-parted deciduous perianth; a 3-celled 2-ovalled ovary; a blunt trigonous stigma; berry with 1-seeded cells; flowers jointed to the pedicel.—*Eng. Cyc.*

(8478) *Convallaria majalis*, the Lily of the Valley, is about a foot high, with two ovate, lanceolate radical leaves. The flowers are racemose, nodding, pure white, globose, bell-shaped, and fragrant.—*Eng. Cyc.*

(8479) VALLISNERIA, a genus of Plants belonging to the natural order *Hydrocharaceæ*. The species of this genus are all water-plants. They are diœcious: the male flowers are seated on a spadix; the corolla is monopetalous with three segments. The female flowers are included singly in a spathe, and are seated upon a spiral peduncle; the calyx is composed of a single leaf; the corolla is polypetalous; the capsules are 1-celled, many-seeded; the seeds parietal. Several species of *Vallisneria* have been recorded in Europe, Australia, and America. The economy of these plants is exceedingly interesting in a physiological point of view. They are plants growing at the bottom of the water, and yet the male and female flowers are separated, and the mode by which they are brought together affords a singular instance of adaption. These plants generally grow in running waters, and thus render the difficulty of the contact of their flowers greater. This is effected by the elongated peduncles of the pistilliferous flowers reaching the surface of the water when the staminiferous flowers are floating along. The *V. spiralis* is found in Italy, in ditches near Pisa, and in the Rhone. There are two Australian species, and also an American and East Indian species. The latter is the *Hydrillus* of Dr. Hamilton, and is used in Hindustan, under the name of Jangi, for the purpose of supplying water mechanically to sugar during the process of refining.—*Eng. Cyc.*

(8480) VALONIA consists of the acorn-cups of *Quercus Ægilops*, or prickly cupped oak, growing in the Morca. As soon as the acorns are gathered, they are dried and conveyed by mules to Symrna for shipment. They are here stored in warehouses for some months in layers from 8 to 5 feet in thickness. The cups undergo a slight fermentation, and in drying, the long spreading scales which confined the acorn contract, and allow the acorn to fall from the cup. The acorns which contain no tannin are separated from the cups, and those of the latter which are damaged are also picked out. The diameter of the cups including the scales is little under 2 inches. A small kind of valonia, *camala*, bears a higher price than the common : it is somewhat richer in tannin, and is chiefly used by the silk dyers. Good valonia is thick, full grown, and bright in colour. If exposed to rain after being gathered the cups lose a portion of their tannin and become of a deeper colour. About 2 lbs. of valonia are required for the production of 1 lb. of leather, which is said to be less permeable to water than that made with oak-bark, and so heavy as to make valonia the cheapest of all tanning materials, except catechu or terra. A mixture of valonia and oak-bark may be used with good effect.

(8481) VAMPIRE. The common Vampire-Bat. [CHEIROPTERA.]

(8482) VANANGU. The Tamil name of a Ceylon tree which grows to about eighteen inches in diameter, and twelve feet in height. It is used by the native carpenters in house-work, &c ; and produces a fruit which the natives eat.—*Edye, Ceylon.*

(8483) VANDA, a genus of plants, the type of the tribe *Vandeæ*, of the natural order *Orchidaceæ* Wight gives Vanda pulchella, 1671 Roxburghii, 916 spathulata, 915 Wightiana, ? 1670.

(8484) VANDA CŒRULIA. Writing of this plant Dr. Hooker says that near the village of Lernai on the Jyntea Hills, oak woods are passed, in which *Vanda cœrulea* grows in profusion, waving its panicles of azure flowers in the wind. As this beautiful orchid is at present attracting great attention, from its high price, beauty, and difficulty of culture, Dr. Hooker points out how totally at variance with its native habits is the cultivation thought necessary for it in England. The dry grassy hills which it inhabits are elevated 3000 to 4000 feet : the trees are small gnarled, and very sparingly leafy, so that the Vanda which grows on their limbs is fully exposed to sun, rain, and wind. There is no moss or lichen on the branches with the Vanda, whose roots sprawl over the dry rough bark. The atmosphere is on the whole humid, and extremely so during the rains ; but there is no dead, or stagnation of the air, and at the flowering season the temperature ranges between 60° and 80°, there is much sunshine, and both air and bark are dry during the day : in July and August, during the rains, the temperature is a little higher than above, but in winter it falls much lower, and hoar-frost forms on the ground. Now this winter's cold, summer's heat, and autumn's drought, and above all, this constant free exposure to fresh air and the winds of heaven, are what of all things we avoid exposing our orchids to in England. It is under these conditions, however, that all the finer Indian *Orchideæ* grow, of which we found *Dendrobium*, *Farmeri*, *Dalhousianum*, *Devonianum* &c., with *Vanda cœrulea*, whilst the most beautiful species of *Cœlogyne*, *Cymbidium*, *Bolbophyllum*, and *Cypripedium*, inhabit cool climates at elevations above 4000 feet in Khassia and as high as 6000 to 7000 in Sikkim. We collected seven men's loads of this superb plant the Vanda cœrulia for the Royal Gardens at Kew ; but owing to unavoidable accidents and difficulties, few specimens reached England alive. A gentlemen who sent his gardener with us to be shown the locality, was more successful : he forwarded one man's load to England on commission, and though it arrived in a very poor state, it sold for 300*l.* the individual plants fetching prices varying from 3*l.* to 10*l.* Had all arrived alive, they would have cleared 1000*l.* An active collector, with the facilities I possessed, might easily clear from 2000*l* to 3000*l.*, in one season, by the sale of Khasia orchids.—*Hooker Him. Jour* : *p.* 321.

(8485) VANDELLIA CRUSTACEA, is given in Wight's Icones.

(8486) VANDELLA DIFFUSA, a native of Brazil, thought to be found also in the peninsula of India. It is the Caaetaica of Pison, and described by Dr. Hancock as emetic, and its decoction as useful in fevers and liver complaints. —*Eng. Cyc.* *Vandellia diffusa* of the Isle of France, Brazil, and Yuagana, is considered of great value as an emetic and febrifuge, and in the treatment of dysentery.—*O'Sh. p.* 477.

(8487) VANGUERIA, a genus of Plants belonging to the natural order *Rubiaceæ.* The species are few in number of which the principal are *V. edulis* of Madagascar, and the Indian *V. spinosa.* Both species form small trees or shrubs, having ovate or oblong petiolate leaves, with lanceolate stipules, solitary on both sides. The fruit of *V. edulis* is eaten by the natives of Madagascar and of Mauritius, where it has been introduced, as well as into the peninsula of India. *V. spinosa*, the Mayna of the natives of Bengal, but which is found in many parts of the plains of India, is a distinct species, though united to the above by Sprengel in his 'Syst. Vegetabilium.' It is said to be also found in China. The fruit is eaten by the natives of India.—*Eng. Cyc.*

(8488) VANELLUS. [CHARADRIADÆ.]

(8489) VANGA. [LANIADÆ.]

(8490) VANGUERIA SPINOSA. THORNY VANGUERIA.

Bungaree kee lakree, also Mayna Mainphul, HIND.
Pedda munga, TEL.

Grows in the Kotah and Mewar jungles; the dried berries are given to cattle, and the fresh berries are sometimes eaten by the inhabitants.—*Genl. Med. Top. p.* 182.

(8491) VANILLA, a genus of Plants, the type of Lindley's natural order *Vanillaceæ.* The name is derived from 'vaynilla,' a diminutive of 'vayna,' which in Spanish signifies a knife or scissor-case, the fruit being long and cylindrical, and like the sheath of a knife. The species are generally supposed to be confined to Brazil, Guyana, and the West Indies, but several have been described by Schiede from Mexico. Species have also been found in Penang, Singapore and Java. The species of this genus are climbing plants,but are not epiphytic, as many of the *Orchidaceæ*, although in climbing up trees they put forth roots as holdfasts, which are capable of absorbing nutriment for the plant when other modes of supply are cut off. The leaves are fleshy, subcordate at the base, and articulated with the stem; the stem is square, and frequently climbs to a height of 20 or 30 feet; flowers are fleshy; the perianthium is articulated with the ovarium, and frequently caliculated; the sepals and petals are nearly equal, conformed and three at the base; the labellum is entire, connate with the column, concave and barbed in the middle; the column is elongated and apterous; the anthers are terminal and opercular; the pollen-masses are two bilobed and granulose; the fruit is siliquiform, fleshy, and dehiscing at the side; the placentæ, from 3-6, covered with seeds; the seeds are globose, and covered with a closely adnate testa. Lindley enumerates eight species as belonging to this genus, two of which have been found in Asia and six in America. The fruits of most of them are aromatic, and on this account have formed a considerable article of commerce from their consumption as luxury.—*Eng. Cyc.* Wight gives Vanilla aphylla, 931; Walkeriæ, 632; *Wightii*, 931.

(8492) VANILLA AROMATICA. Aromatic Vanilla, has ovate-oblong acuminate sessile leaves; perianth companulate, with five undulated acuminated laciniæ; the labellum acuminate, cucullate at the base, with an elevated naked middle line. This species is the *Epidendrum Vanilla* of Linnæus, and is a native of Brazil, and was supposed at one time to yield all the vanilla of commerce. Under this name have been included two or three species of *Vanilla*, one of which is probably the only species that yields vanilla. The vanilla which is added to chocolate, custards, and many kinds of confectionary to give them a pleasant flavour is th produce of V. aromatica.—*Eng. Cyc.*

(8493) VANILLA. *sp.* Dr. Falconer discovered while on his visit to the Tenasserim Provinces in 1849, a new species of vanilla, but its specific name and description have not yet transpired.—*Mason.*

(8494) VARANIDÆ, *Varanians*, a family o Lizards, designated by Messrs. Dumeril and Bibron as Platynote or Broad-Backed Saurians and thus characterised by them:—Body very much elongated, round, and without a dorsal crest, supported on strong legs and feet, with distinct and very long but unequal toes. Tail slightly compressed, at least twice longer than the trunk. Skin furnished with enchased scales, which are tuberculous, pojecting, rounded upon the head as well as upon the back and sides, always distributed in rings or circular bands, parallel under the belly and round the tail. Tongue protractile, fleshy, similar to that of the serpents that is to say capable of elongation and of being withdrawn into a sheath, narrow, and flattened at the base, and deeply divided and separated into two points which can be divaricated as in the Ophidians. Linnæus arranged these Saurians under the great genus *Lacerta.* Daudin separated the larger portion of the species under the generic appellation of *Tupinambis.* Dr. J. E. Gray, in his 'Synopsis' (1827), arranged under his family *Varanidæ* the genera *Varanus* and *Dracæna* of Merrem, which he very well characterised. No such family as the *Varanidæ* appears in Dr. Gray's Table, published in the British Museum Synopsis (1842), and the British Museum Catalogue (1845); but the *Monitoridæ* (which are the first family of the *Leptoglossæ*, the first group of his *Sauria*) consist of the genera *Psammosaurus*, *Monitor*, *Polydædalus*, *Empagusia*, and *Hydrosaurus.* [MONITORIDÆ.] Next to the *Crocodilidæ*, the *Varanidæ* attain the greatest size of any of the Saurians; indeed Herodotos,Ælian,and others regarded them as terrestrial crocodiles. The *Varanidæ* are divisible into two distinct groups: the eminently terrestrial group, whose abode is far from the waters, in desert and sandy places; and the aquatic group, consisting of those which inhabit the banks of rivers and lakes. America claims one only,—that on which the genus *Heloderma* is founded. In Asia there are four *Varani* properly so called; three in Africa; and four in Oceania. Of these four, two have been observed in Australia, one in the isles of the Papuan Archipelago, and the fourth in the Isle of Timor.—*Eng. Cyc.*

(8495) VARNISH. A varnish is a solution of a resin or of a gum-resin in a liquid, which being spread over a surface, evaporates, and leaves the solid in the form of a brilliant, transparent film. The principal substances used in varnishes are the following:—

SOLVENTS.	SOLIDS.	COLOURS.
Oil of Nuts.	Amber. Elemi	Gamboge. Annotto.
„ Linseed.	Anime.	Dragon's blood. } Red Saunders
„ Turpentine.	Copal. Benzoin	
„ Rosemary.	Lac Colophony	Aloes Cochineal.
Alcohol. Ether.	Sandarach. Arcanson.	Saffron. Indigo.
Wood-naphtha or pyroligneous ether. }	Mastic.	Turmeric.
	Damar.	
	Common resin.	

The resins, or as the Varnish-maker calls them, *gums*, may be used either singly or combined, and the same remark applies to the solvents. One of the most desirable qualities in a varnish is durability, a quality which depends greatly on the comparative insolubility of the resin employed, its hardness, toughness, and permanence of colour.

Amber is most distinguished in these respects: it resists the action of ordinary solvents, and requires to be fused at a high temperature, for making varnish: it is hard, and moderately tough, and its colour is scarcely acted on by the air. The objections to amber are its costliness and the length of time required for amber-varnish to dry; it does not become full hard under many weeks. [See AMBER]

Anime is imported from the East Indies in chests weighing from 3 to 5 cwt. Those which contain the palest and largest gum fetch the highest price. It should be scraped by hand before being sold, but a good deal of it is *pickled* that is, cleaned from its rust-like colour, by being steeped for several days in a strong alkali, well washed with a broom and hen rinsed with water. This kind sells for about one-third less than that which has been scraped with a knife. The varnish maker picks out the large, pale, transparent pieces, or hey are sold separately as *body-gum;* the next best in quality is separated from the third and worst quality which is used for gold-size or japan-black. Anime is almost as insoluble and hard as amber, but not so tough: the varnish made with it dries quickly, but is liable to crack, and he colour deepens by exposure to air and light. Anime is largely used in oil varnishes, and there is a large proportion of it in *copal varnishes* on account of its drying quickly.

Copal is produced in India, America, the West Indies, Sierra Leone &c. Dr. Lindley ays that "the copal of Madagascar, and probably of the East Indies generally, is urnished by *Hymenæa verrucosa*," that "*Vaeria Indica* furnishes the resin called in India *copal*, (in England known by the name of *gum animi*,) and very nearly approaching the true esin of that name: in its recent and fluid state it is used as a varnish, (called *Piney* varnish,) in he south of India, and, dissolved by heat, in losed vessels, is employed for the same purpose in other parts of India; it is extremely tenacious and solid, but melts at a temperature of 97½° Fahr. Dr. Wight tells us that the natives obtain it by the simple process of cutting a notch in a tree, sloping inwards and downwards: the resin collects there, and soon hardens. ["The Vegetable Kingdom," 1846. On the Malabar coast, this resin, under the name of *Piney Dammar*, is made into candles, "which diffuse in burning an agreeable fragrance, give a clear bright light with little smoke, and consume the wick so as not to require snuffing. Some of these candles that were sent home were highly prized and sold for very high prices." (*Wight*) Their importation was stopped by the high duties that were levied on them.] Copal is generally imported in lumps about the size of small potatoes, of as slightly yellow tint, and often including insects and animal remains. It is often covered with a clay-like substance, from which it is freed by the dealers by scraping. The finest and palest lumps are selected for what is called *body*-gum; the next best form *carriage-gum*, and the remainder being freed from wood and stones, forms what is called *third*, or *worst quality*, and is used for gold-size or japan-black. Copal has a conchoidal fracture; it is transparent, inodorous, and tasteless. Its density varies from 1.045 to 1.139. It softens by heat without becoming viscid, and at a higher temperature fuses, partly decomposes, and gives off an aromatic odour. Copal is next in durablity to amber: the pale specimens, when made into varnish, become lighter by exposure. It is an excellent material for varnishes, and attempts have been made to use it as the basis of a spirit varnish; it is, however, so little soluble in alcohol, that when boiled therein, only a small portion dissolves, and the remainder swells and softens. It is said, however, that by reducing copal to an impalpable powder, and exposing it for about 12 months to the action of the air, it becomes soluble in alcohol, and may be used for preparing varnishes. The addition of a small quantity of camphor increases the solubility of copal in alcohol; the same effect is produced by fusing it, setting it on fire, and allowing it to burn a few minutes: these, and similar plants, however produce a very inferior varnish. Oil of rosemary is said to be one of the best solvents of copal: ether is probably the best solvent, but it evaporates so rapidly that the varnish cannot be spread equally. The oils of spruce and lavender have also been used as solvents. The three resins, amber, anime, and copal, either separately or mixed in certain proportions, are converted into varnish by fusion and the addition of linseed-oil heated nearly to its boiling point: the combination of the resin and the oil is promoted by stirring and boiling, and the required degree of fluidity in the varnish is attained by the addition of oil of turpentine. These are the most important of the *oil varnishes*;

they are the most durable, they are hard enough to bear polishing, and they possess considerable brilliancy. They are used for works of the best quality, such as are exposed to the weather or to much friction, as coaches, japan-work, and house decorations.

Lac and *sandarach* form the basis of *spirit varnishes*; these resins are more soluble than amber, anime and copal; they are dissolved in spirit of wine, or pyroligneous spirit, which is cheaper. In France, where alcohol is very cheap and abundant, spirit varnishes are largely employed. [Dumas, in the seventh volume of his "Traite de Chimie," has a large collection of recipes for spirit varnishes.] They are used for cabinet and painted works not exposed to the weather. [See LAC—SANDARACH.] Lac is harder than sandarach, and is the basis of most lackers [see LACKER], and also of French polish [see FRENCH POLISH]. Sandarach is used for making a pale varnish for light-coloured woods: it may be hardened by the addition of shell-lac or of mastic if required to be kept pale; and when required to be polished, Venice turpentine is added to give it body.

Mastic is a soft resin: dissolved in spirits of wine or oil of turpentine it makes a very pale varnish: it is brilliant, works easily, and flows better on the surface than most other varnishes. It can also be removed by friction with the hand, hence its use as a picture varnish and for other delicate works. See MASTIC.

Damar is softer than mastic: it forms an almost colourless varnish with turpentine: mixed with mastic it forms a moderately hard, flexible, and almost colourless varnish adapted for maps and similar purposes.

Common resin, dissolved with the assistance of heat in turpentine or linseed oil, makes a hard, brittle, brilliant varnish, which is employed for common purposes, as in house painting, toys, cabinet work, &c. It improves the brilliancy of other varnishes, but renders them brittle unless used sparingly.

The *linseed oil*, used as the vehicle for the harder resins, should be pure, pale, well clarified, and combined with the resin at as low a temperature as possible. Unless these conditions be attended to, a dark varnish is produced which becomes darker by age. This oil gives softness and toughness to the resin, but produces a slowly drying varnish. It is clarified for the best varnishes by being gradually raised to near the boiling point in a copper pan. Fig. 2221.

Turpentine is in extensive use for varnishes, either as a vehicle for the resins or for thinning oil varnishes, in which case it is used hot. The turpentine should be of the best quality, clean and limpid; it is greatly improved by age, and should be kept for months or even years. Turpentine varnishes are cheap and flexible; they dry more quickly than oil varnishes, and are of a lighter colour, but not so tough or durable. Mastic, damar, and common resin may be dissolved in oil of turpentine either cold or a, a gentle heat.

Alcohol or *spirits of wine* is used as the vehicle for sandarach and shell-lac, as in the *white* and *brown hard spirit varnishes*. Spirit varnishes dry more quickly, harder and more brilliant than those made with turpentine. The spirit must contain very little water or it will not dissolve the resins; and in applying the varnishes a moderately moist atmosphere is sufficient to occasion such a precipitation of the resins as to produce a dull, cloudy, or milky effect on the varnished surface: in which case the varnish is said to be *chilled*. The varnish-maker ascertains whether the spirit is strong enough by steeping a piece of writing paper in it and setting it on fire; if the flame consume the paper the spirit is judged to be sufficiently strong; if not, it contains too much water.

Naphtha or pyroligneous ether is objectionable on account of its smell, but is used for cheap varnishes. It dissolves the resins more readily than ordinary spirit of wine, but the varnish is not so brilliant.

Copal varnish for fine paintings, &c.—Fuse 8lbs. of the cleanest pale Africa gum-copal, and when completely run fluid, pour in 2 gallons of hot oil: let it boil until it strings strongly; and in about 15 minutes, while still very hot pour in 3 gallons of turpentine obtained from the top of the cistern. There may be much loss of turpentine during the mixing, but the varnish will be so much the brighter, transparent, and fluid, and will work freer, dry quickly, and be very solid and durable when dry. If the varnish be too thick after being strained, hot turpentine is to be added before the varnish is quite cold.

Artist's virgin copal.—From a select parcel of scraped African gum-copal, before it is broken, pick out the very fine transparent pieces, which appear round and pale like drops of crystal; break these very small; dry them in the sun, or by a very gentle fire. When cool, bruise, or pound them into a coarse powder. Next, boil some broken bottles or flint glass in soft water and soda, and pound the glass into a coarse powder; boil it again, strain off the water, and wash it in 3 or 4 waters, that it may be perfectly free from grease, dry it before the fire, or in an oven. Mix 2 lbs. of powdered glass with 3 lbs. of powdered copal; put them into the gum-pot and fuse the gum, stirring all the time: the glass will prevent the gum from adhering together, so that a very moderate fire is sufficient to fuse the gum. When the gum is sufficiently run, pour in 3 quarts of very hot clarified oil. Let the varnish boil until it strings freely between the fingers. Mix it rather hotter than if it were body-varnish, for, as there is but a small quantity, it will be sooner cold. Pour in 5 quarts of old turpentine, strain it immediately, and pour it into an open jar or large glass bottle; expose it to the air and light, but keep it from the sun and moisture until it is of sufficient age for use.

Cabinet varnish.—Fuse 7lbs. of very fine African gum-copal, and, when well run, pour in half a gallon of pale, clarified oil: when clear, mix it with 3 gallons of turpentine, and strain. This, if properly boiled, will dry in 10 minutes; but if boiled too strongly it will not mix with the turpentine; and sometimes, when boiled with the turpentine, it will mix, but will not combine with any other varnish that has been less boiled than itself. This varnish is used by japanners, cabinet, and coach painters. Animé is however generally used for cabinet varnish.

Best body copal varnish, for the body parts of coaches and other objects intended for polishing, is made by fusing 8 lbs. of fine African gum-copal, and adding 2 gallons of clarified oil. It must be boiled very slowly for 4 or 5 hours until quite stringy, and be mixed off with $3\frac{1}{2}$ gallons of turpentine.

The foregoing varnishes are made of the finest copal without the addition of driers; they are the palest and best of their kind, and have great fluidity and pliability. They are, however, slow in drying, and it requires months for them to become hard enough to polish well. If the varnish is not required to be very pale, gum of second quality is used, and if required to dry quickly, sugar of lead or white copperas, singly or together, are used in the proportion of $\frac{1}{2}$ lb. to 1lb. to each of the quantities given in the recipes; but the brilliancy, colour, and durability of varnishes are injured by the introduction of driers. If the varnish be required to dry and harden quickly without the use of driers, anime may be used instead of copal, but it does not form so durable a varnish, and it becomes darker by age. Anime varnish may be mixed with copal varnish in certain proportions, while both are hot. A moderately quick drying body-varnish may be made by mixing 1 part of anime with 2 parts of copal; for an inferior varnish, drying more quickly, 2 parts of anime to 1 part of copal may be mixed.

Carriage varnish for the wheels and under frame-works of coaches and other objects not requiring to be polished is made like common body-varnish, only that to 8lbs. of gum of second quality are used about $2\frac{1}{2}$ gallons of oil and $5\frac{1}{2}$ gallons of turpentine, with driers. This varnish is boiled until it becomes very stringy. Its quality is intermediate between body-varnish and

Wainscot varnish, which is made of 8 lbs. of animé of second quality, 3 gals. of clarified oil, $\frac{1}{4}$ lb. of litharge, $\frac{1}{2}$ lb. of sugar of lead, $\frac{1}{4}$ lb. of copperas. These ingredients must be well boiled until the varnish strings very strong, and it must be mixed with $5\frac{1}{2}$ gals. of turpentine. This varnish, which dries quickly, is used chiefly for house painting and japanning. It may be darkened by the addition of a small quantity of gold size.

Spirit and *turpentine* varnishes are prepared by mixing the resins and the solvent together, and agitating the whole with a stick with a number of pegs or nails driven in near the lower end until the solution is complete. The resins should be dry, and in small pieces, with the impurities picked out: the finest and clearest pieces of the gum are set aside for superior varnishes. Turpentine varnishes are made in quantities of 10 or 12 gallons: spirit varnishes from 4 to 8 gallons. In making the latter, the ingredients are sometimes put into a cask of 8 or 16 gallons' capacity, and mounted so as to revolve upon bearings at the ends. An alternating motion is given to the barrel by passing round it a cord terminating in a cross handle. When the operator pulls this cord towards him the barrel rotates, and winds the cord up in the other direction so as to be ready for a second pull, which, in like manner, winds the cord in the opposite direction, and so on. Agitation must be kept up, or the resin will agglutinate. After 3 or 4 hours, or when the solution is complete, the varnish is left for a few hours to deposit solid impurities, and is then strained through muslin or lawn into bottles. Coarsely pounded glass is sometimes added to prevent the agglutination of the resin. When heat is employed in making spirit-varnishes, the source of heat should be a water or a sand bath, and a still and worm may be used to prevent loss by evaporation, the resins and solvent in the still being kept in motion by a stirrer passing through a stuffing-box in the head. Shell-lac contains a little wax, which is apt to get diffused through the varnish when heat is applied. The inflammable nature of the ingredients will of course suggest the necessity for caution in making spirit-varnishes. The utensils employed must be quite clean and dry.

Best white hard spirit varnish, such as will bear polishing, is made by adding 2 lbs. of the best picked gum-sandarach to 1 gallon of spirits of wine, and agitating for 4 hours, until the solution is complete. 18 ozs. of Venice-turpentine, (or 9 ozs. if the work is not to be polished,) are to be moderately heated in a water-bath until quite fluid, and added to the varnish to give it body. Agitate for an hour, strain and put into bottles, which must be kept well corked. After remaining undisturbed for a week, the varnish is fit for use. If the clearest and palest pieces of gum be selected, this varnish will be pale enough for white work.

White hard varnish.—(No. 1.) $3\frac{1}{2}$ lbs of gum-sandarach to 1 gallon of spirits of wine, and when the solution is complete add 1 pint of pale turpentine-varnish, and shake the whole well together. (No. 2.) 2lbs. of gum-sandarach, 1 lb. of gum-mastic, and 1 gallon of spirits of wine. *White spirit-varnish for violins.*—2 lbs. of mastic to 1 gallon of spirits of wine and 1 pint of turpentine-varnish.

Brown hard spirit varnish is similar to white hard varnish, only shell-lac is used instead of sandarach. Dissolve 9 lbs. of shell-lac in 1 gallon of spirits of wine, and then add 18 ozs. of Venice-turpentine, warmed. This varnish will bear polishing. Or, 2 lbs. of shell-lac, 1 lb. of sandarach, and 2 ozs. of mastic dissolved in 1 gallon of spirits of wine. A lighter colour is produced with 2 lbs. of sandarach, 1 lb. of shell-lac, and 1 gallon of spirit. When the solution is complete add a pint of turpentine-varnish, and agitate the whole well together. If a pale lac-varnish be required, *white* or *bleached lac* may be used. Lac-varnish may be bleached by Mr. Leming's process :—"Dissolve 5 ozs. of shell-lac in a quart of rectified spirits of wine ; boil for a few minutes with 10 ozs. of well-burnt and recently heated animal charcoal, when a small quantity of the solution should be drawn off and filtered ; if not colourless, a little more charcoal must be added. When all colour is removed, press the liquor through silk, as linen absorbs more varnish, and afterwards filter it through fine blotting-paper." [Transactions of the Society of Arts, vol. xlv. In the same volume is a recipe by Mr. G. Field for bleaching lac-varnish by means of chlorine. Dr. Hare has also published a method as follows: —"Dissolve in an iron kettle 1 part of pearlash in about 8 parts of water, add one part of shell or seed-lac, and heat the whole to ebullition. When the lac is dissolved cool the solution and impregnate it with chlorine gas till the lac is all precipitated. The precipitate is white, but the colour deepens by washing and consolidation ; dissolved in alcohol, lac bleached by this process yields a varnish which is as free from colour as any copal varnish." The application of the chlorine must be made by a person acquainted with chemistry. Hence chloride of lime is safer as a bleaching agent, the lime being afterwards dissolved out from the precipitate by the addition of muriatic acid. The precipitate is to be washed several times, dried and dissolved in alcohol with the addition of a little mastic. This varnish is very pale, but rather thin. When copal is added to spirit-varnishes in order to increase their toughness and durability (although the advantage of adding copal may be questioned), the copal should be in fine powder, the spirit very strong, and a gentle heat of about 120°, with frequent agitation, should be used. A light-coloured varnish may be made with ¾lb. of shell-lac, ¾lb. of copal, to 1 gallon of strong spirit.—*Tomlinson.*

(8496) VARNISHED WARE OF THE BURMESE. The process of making this ware has been minutely described by Major Burney, who witnessed every branch of the manufacture at Amrapura, and the museum of the Asiatic Society in London contains several specimens of various kinds, as well as a set of cups' in every state from the first weaving of a few strips of bamboo to the complete formation of an elegant article of domestic economy. A description of each specimen will best explain the whole process. The first is a wooden frame of wood covered with strips of bamboo woven together so as to form a basket, which is the frame work of the intended cup ; the weaving is like that of a lady's work basket, and care is taken, that it shall be as thin and light as possible, as upon this matter the beauty and delicacy of the ware will depend ; towards the edges, the weaving is of a coarser nature, and the bamboo is made as fine as hair.

2 The basket is covered on the outside with varnish laid on with a brush, made of the husk of the cocoanut. The varnish is the essential part of the manufacture, without which nothing can be done, it is named thit-tsi (wood oil) and is procured from a tree of which there are extensive forests in the northern parts of the Burmese empire. The varnish may be gathered at all times but if taken during the flowering season which is at the beginning of the year, it does not harden well. It appears to be in many of its properties analogous to China varnish, and it affects in a similar way the health of those who prepare it : not apparently to such a degree as in China, but still enough to be very unpleasant to those unaccustomed to it who frequently find their hands blistered and their arms and faces swelled with its effects. All who use it take certain precaution against accidently swallowing any portion and they are careful to touch it with the right hand only while they take their food with the left. Some persons are more seriously affected by the varnish than others and its injurious effects appear in blotches so much resembling leprosy that the other Burmese refuse to hold intercourse with the affected person. The varnish as before remarked, is laid on with a brush, to spare the hand as far as practicable: but in all future operations on the same vessel it is laid on with the hand both in order to procure a fine surface and to enable the workman to discover and reject the minutest particles of dust. When first laid on, the varnish looks of a light brown colour, but rubbing with the hand turns it to a fine black. When the cup is varnished, it must be carefully shut up in a box to exclude the dust, and then deposited in a deep cold vault. This is said to be essential to its proper setting and with one of which every manufactory is provided. The cup is kept in the vault at least three days.

3 The third cup is advanced another step towards completion, it is covered over with a thick black paste which is intended to stop up all holes in the baskets and to give the ware a

body. Different pastes are used for this purpose but all agree in being composed of some fine powder mixed up with thit-tsi, in one sort, the powder is that of calcined bones; in another the fine saw dust of teak wood; in all cases the paste is dabbed on with the fingers, so as to hide the basket as far as the workman is able to do. The specimen under description looks black and rough, and the basket appears in several places through the paste, after this process as well as after every other in which the varnish is used in any shape, the cup is returned to its concealments in the vault, where it must remain at least three days before any subsequent operation can be proceeded.

4 The next specimen is the cup ground smooth inside. The operation is performed in a clumsy lathe, one of which is in the Asiatic Society's museum, it is more like the roller on which a jack towel is hung behind a kitchen door than the instrument we call a lathe. This roller is turned backwards and forwards with a stick and leather string like the drill bow of our workmen, and a hollow cylinder. The workman inserts the rough cup, and if it is not large enough to stick tight in it, he fixes it there by slips of bamboo, he then smears the inside of the cup with water mixed with an ochrey red earth, turns the lathe rapidly with his right hand, and presses a piece of pumice stone held in his left hand, against the inside of the cup, this process soon rubs down the rough surface of the paste, and is continued until it is quite smooth. The specimen is smooth on the inside the paste is rubbed down quite level with the basket work which appears through it, but without injury to he smooth surface. The outside of the basket s unaltered.

5 The fifth cup has undergone precisely the same operation on the outside, the only differences in the manipulation being that the cup was fastened upon a form or chuck, so as to leave he outside open to the workman, instead of beng put into a basket to expose the inside.

6 This cup is covered on the inside with n additional quantity of paste of finer quality which was laid on by the workman after the outside was ground smooth, and dried in order hat it might receive an additional polish on a subsequent day.

7 This specimen is covered with fine paste on the outside as well as on the inside. Its appearance is rough and black. In this stage the cup has been ground outside and in, and has also eceived a coat of fine varnish. This is the result of the two successive operations with the interval of at least three days between them, the grindng is performed on the lathe, as in No. 4 and 5 but instead of pumice stone, the workman employs first a piece of smooth sandstone then a ag with charcoal and water, and lastly a piece f moist cloth. The cup is dried well in the sun before the varnish is laid on, which is done with the finger.

8 This cup has received a second coat of varnish and is quite black and glossy, but not even on the surface. Thus far all the Burmese ware goes through the same processes whatever may be the style in which they are to be finished, whether black or red, plain or figured. The remaining specimens show the various modes, in which the manufactures furnish off their work, according to their own state or that of their employers.

9 The next cup is simply polished in the lathe, this is performed by turning first against a piece of smooth stone as in No. 7 then by moistened rice husks, held in the hollow of the left hand against the cup while turning; thirdly by a rag dipped in well pulverised teak wood, and lastly by the hand smeared with a peculiar polishing powder, said to be made of the petrified wood of a tree. The ware thus furnished is like the black japaned ware used in Britain.

10 The ware in this specimen is red like sealing wax, not so fine as British red japanned ware, but still clear and bright. The colour is manufactured at Ava, and is said to be superior to the best Chinese vermillion, it is moistened with an oil called shazi, extracted from the *kunyen* (*Dipterocarpus turbinatus*) and then mixed ed with thit-tsi varnish. The mixture is laid upon the cup, after it has gone through the two first operations of No. 9 and nothing more is required than giving it a polish with the hand unless extraordinary lustre is desired when a mixture of shauzy and thit-tsi is applied.

Specimens 11 and 12 are engraved cups executed in the Shan or Siamese style. The engraving is done with great ingenuity and rapidity, although the only tool is a needle tied to a stick and whetted on a bit of slate. The artist holds the cup on his knees with his left hand and keeps his graver almost motionless in his right, he then dexterously turns the cup by the help of his knees to meet the graver. The Shan style consists in engraving a piece of black ware as No. 9 and filling up the hollows with vermilion, if any figures are represented they are left in relief, in the manner of wood engraving. Some grotesque figures done in this way are seen in number 12. In specimen No. 11 the hollows are not yet filled in, and the cup has a greyish appearance, arising from the light brown lines left by the graver in the polished black varnish. The vermillion is laid on as in No. 10, and after drying several days is rubbed off in the lathe with wet bran held in the hollow of the hand. The operation is generally repeated to ensure a complete filling up of all hollows and the cup is afterwards varnished and polished.

A more expeditious method called the Burman style, consists in engraving upon a red cup left as in No. 10 and filling up the hollows with different colours, usually yellow or green, specimen 13 is engraved with grotesque Chinese looking figures, and 14 is a similar one with the lines filled with yellow or primrose, The engraving is first prepared by being varnished over, the colour is immediately rubbed in with the finger until it is quite dry, when the cup is finished sometimes a small quantity of indigo is mixed with the orpiment, which produces a green colour, several articles in the Society's museum are very finely executed in this way, some of which have both colours in the same specimen. The beauty of the engraving consists chiefly in the contrast of bright colours, and the regular interlacing of minute lines in which some specimens resemble our engine turning ; taste or drawing is totally out of the question.—*Rohde. M. S. S.*

There are other modes of preparing the varnshed ware : the finer sorts are sometimes, finished with gilding or with raised figures or mouldings. These are formed of the teak wood paste mentioned in specimen 3 which is pressed when soft, into tin moulds and when dry it becomes as hard as the wood of which it was originally made. Europeans have found this paste an excellent material for making the raised work on picture frames and similar objects. Some articles are diversified by leaving portions of the basket work uncovered by the varnish, in this case the weaving is of the finest quality, and the open parts being of different patterns the effect is very good. Larger works are made of wood, joined together with teak paste, and afterwards covered in the same way as the basketwork, the only difference between the process being, that in the wood work, the first varnishing is omitted, the solid and flat surface of the wood taking the paste at once without preparation. —*Rhode M. S. S.*

(8497) VARNISHED WARE OF CHINA. RHUS VERNIX or VERNICIA, CHINESE VARNISH TREE. When Mr. Fortune prepared to take up his late residence in China, his attention was directed by the Calcutta Agricultural Society, to the Chinese varnish tree, *Rhus* species, the wax insect tree, *Fraxinus* species, and to the soap bean tree, *Cæsalpinia* species : to the various trees valuable for their fruit or timber and ornamental plants ; but above all to the green indigo (so called), *Rhamnus* species, which yielded a dye that was at that time attracting much attention in France. He says, the tree which yields the Chinese varnish is a species of Rhus which although producing an article of great value is extremely dangerous to use. The varnish is largely used in the country for giving a fine polish to tables and chairs used in the houses of the wealthy. The beautiful lacquer ware so extensively exported from Canton to foreign countries, and which is so well known and justly admired, is produced by this tree. It has the valuable property o being less liable than French polish to be injure by a heated vessel which may be placed upon it but it is very poisonous and requires to be handled with great care by the workmen who use it Indeed after furniture is dry it is very unsafe fo certain constitutions until it has been in use fo some time and the smell entirely gone. A frien of his Mr. Jones, American Consul at Foochow too, used some furniture which had been laquere some time and was apparently quite dry and ye he was very ill for a long time from its effect so ill that he thought he should be obliged to leave the country and go home. And thi is no solitary instance, for he has known severa persons suffer most severely from the same cause —*Fortune's Residence, p.* 146. Williams, however, says the beautiful appearance of the lacquered-ware of China owes its lustrous coloring to composition of lampblack and the clarified juic obtained from a species of sumach, called *Rhus Vernix* or *Vernicia*. Wood oils are obtained from other plants of the same family, and the different qualities of lacquered-ware are owing to the use of these inferior ingredients. The real varnish tree is described by De Guignes as resembling the ash in its foliage and bark, it is about fifteen feet in height, and furnishes the sap when seven years old, which is carefully collected from incisions in the trunk opened in the summer nights. The body of the ware is wood partially smoothed, or pasteboard, upon which two or three coats of a composition of lime, paper, and gum are first laid and thoroughly dried and rubbed. The surface of the wood is also hardened by rubbing coarse clay upon it, and afterwards scraping it off when dry. Two coatings of lamp black and wood oil, or in the finer articles, of lamp black and varnish, are laid upon the prepared wood, and after drying, the clear varnish is brushed on, one coating after another, with the utmost care, in close and darkened rooms, allowing it to dry well between the several coats. The articles are then laid by to be painted and gilded according to the fancy of customers, after which a last coating is given them. The varnish is brought to market in brownish cakes, and reduced to its proper fluidity by boiling ; it is applied to many purposes of both a varnish and paint, when it is commonly mixed with a red or brown color. A beautiful fabric of lacquered-ware is made by inlaying the nacre of fresh and saltwater shells in a rough mosaic of flowers, animals &c. into the composition and then varnishing it. Another kind, highly prized by the Chinese, is made by covering the wood with a coating of red varnish three or four lines in thickness, and then carving figures upon it in relief. The great labour necessary to produce this ware renders it expensive. A common substitute for the true varnish is the oils of the Dryandra, Jatropha, Croton, and other members of the

Euphorbiaceous family, expressed from their seeds by a variety of simple machines, consisting for the most part of different applications of power to cylinders and pestles by which the seeds are pressed or pounded. The oil, after pressing, according to De Guignes, is boiled with Spanish white in the proportion of one ounce to half a pound-of oil; as it begins to thicken, it is taken off and poured into close vessels. It dissolves in turpentine, and is used as a varnish, either clear or mixed with different colours: it defends woodwork from injury for a long time, and forms a good painter's oil. Boiled with iron rust, it forms a reddish brown varnish. In order to prevent its penetrating into the wood when used clear, and to increase the lustre a priming of lime and hog's blood simmered together into a paste is previously laid on.—*Williams' Middle Kingdom, Vol.* I. *p.* 121.

(8498) VARNISHED WARE OF INDIA. In Peninsular India the varnish used by Moocheemen for Palanquins &c., is prepared by melting *Sandaris* (a kind of *Copal* or *Anime* called by by Ainslie *Sandarach*, and mixing it with boiled linseed oil rendered drying with litharge; they do not usually add spirits of turpentine in the way prescribed for making Copal varnish in England. Mr. Rohde knows of no better or more durable polish, for Teak and Chittagong wood particularly, than may be prepared by melting three or four bits of Sundaris of the size of a walnut or small egg, and pouring upon it a bottle full of boiling linseed oil, (*Avisha noona* Tel.,) previously rendered drying by boiling litharge or other drier and after boiling them together for an hour gently adding while cooling a tea-spoonful of Venice turpentine. If too thick it may be thinned with spirits of turpentine. It should be rubbed on the furniture and after a little time, during which it may be exposed in the sun, rubbed off, the rubbing should be continued daily, and the polish should not be again applied for eight or ten days, after which it may be slightly applied every one or two months. Water does not injure this polish and any stain or scratch may be rubbed over with the polish which cannot be done with French polish. To give the appearance of gold to silver leaf used by the Condapilly Moochies for ornamenting boxes, palanquins &c. a little aloes is dissolved in the varnish which is laid over it. A very good varnish is prepared by Moochies with shell lac and wood oil heated in small quantities.—*Rohde M. S. S.*

(8499) VATERIA, a genus of Plants belonging to the natural order *Dipterocarpaceæ*. It is characterised by having the calyx 5 cleft; segments at length at length reflexd; petals 5, oval, emarginate, twisted in the bud: stamens 40 to 50, short, inserted between the petals and the base of germ; anthers long, linear; capsule 3-valved, 1 celled, and 1-seeded; cotyledons stalked. The species are two in number, V. *Indica,* which grows all along the Malabar coast and in Canara; and *V. lanceæfolia*, which is common in Silhet. Both species form large trees with entire smooth coriaceous leaves, and terminal panicles of white flowers; and both are valuable not only as timber-trees, but for yielding valuable, almost unique products. *V. Indica* grows to the height of about 60 feet, and yields valuable timber, which is much employed in ship-building, and is not liable to be attacked by the teredo. When the bark is wounded, a pellucid, fragant, acrid, bitter resinous fluid exudes, which in the rays of the sun becomes yellow and fragile like glass. This resin is well known in commerce, and is usually called Copal in India, but when imported into England receives the name of Gum Anime. The fluid resin also makes a good varnish, which is called Pundum, or Liquid Copal; on the Malabar coast it is often called Piney Varnish, and the tree Piney Varnish-Tree, or Piney Marum. The dry resin, boiled with more or less oil, is used for the purposes of tar and resin; it is also employed by the natives instead of frankincence, Besides these, another valuable product is yielded by this tree, and that is a fatty substance, which is known by the name of the Piney Tallow, or Vegetable Tallow, of Canara. This is obtained by boiling the seeds, when the fatty substance floats to the surface, and on cooling down becomes of the consistence of tallow. In colour the different specimens vary from pale yellow, or fawn, to perfect white. Its general properties, such as its hardness, colour, combustibility, and fusibility, place it between wax and tallow; but it is far superior to the latter, having no disagreeable smell either when burning or at common temperatures.

(8500) VATERIA INDICA. Linn. CHLOROXYLON DUPADA. Buch. Ham.

Piney marum, TAM.	Chadaeula, TEL.
Dupa marum, CAN.	Payanee, MALABAR.

This is a very large and stately tree, a native of Malabar, and lately found also in Mysore. The young shoots and all tender parts except the leaves are covered with fine stellate pubescence, leaves alternate, petioled, oblong, entire, from emarginate to obtuse, pointed, smooth, coriaceous, from four to eight inches long and two to four broad, petioles round, about an inch long; stipules oblong, panicles terminal, ramifications rather remote; flowers rather remote, pedicelled, pretty large; bractes oblong, one flowered; calyx five, cleft to the base, divisions oblong, obtuse, villous on the outside, corolla five petalled petals oval, emarginate, broader but very little longer than divisions of the calyx, filaments from 40 to 50, short, broad inserted between the petals and the base of the germ, anthers linear with a single filiform beak; germ superior, conic downy, three celled, cells containing 3 ovules each, attached to the top of the axis, style longer than the stamens, stigma acute, pericarpium acoriaceous, fleshy, oblong, obtuse, one-celled, three-valved capsule, general size about 2½ inches long and 1½ in diameter, seed solitary of same shape as the capsule.—(*Roxb. Fl. Ind. p.* 601).

The Oil.

Piney Tallow or Doopada Oil, Eng.
Piney Yennai, Tam.

This most valuable tree, which, besides the product under consideration, yields a resin nearly equal, and furnishes an excellent building wood, grows plentifully in the jungles of the Western Coast. The oil which is perfectly solid even in hot climates, is prepared by cleaning the seeds, then roasting and grinding them into a mass. To 5 seers of seed, add 12 seers of water and boil until the oil rises to the surface. Remove the oil, stir the contents of the vessel, and allow it to stand until the following day, when more oil will be observed on the surface, which may be collected and the process repeated. The oil is principally used for lamps, but is very suitable for soaps and candle making.—*M. E. J. R.*

Doopada Resin. The Resin—exudes from the *Vateria Indica*, and constitutes piney varnish. The resin is used as a fragrant insense in Temples, the quantity procurable is very considerable.—*M. E. J. R.*

No. 2. White Dammer or Piney resin (*Vateria Indica* and allied species) of Linnœus and Wight. *Choloroxylon Dupada* of Buchanan and Ainslie the *Doopada* resin of Mysore and the *Payanee* or *Piney* of the Malabars.

Variety 1. Piney resin having exuded spontaneously from the tree. Occurs in large lumps of all shapes and varying in color on the outside from a bright orange to a dull yellow, bearing evident marks of having adhered to the bark of the tree. It has a shining vitreous fracture, is very hard and bears a great resemblance to amber.

Its color (internally) is of all shades from a light green to a light yellow, the green tint predominating in the generality of specimens—It is more soluble in alcohol than the Black dammer and burns with less smoke and a more agreeable odour. It is easily distinguishable from all other Indian resins by its superior hardness, its color and amber-like appearance.

Variety 2. *White dammer or Piney resin, obtained by wounding the tree.* Occurs either in small lumps or in large masses, generally of a shining appearance and balsamic smell. Has a very cellular structure which is attributable to the mode of collection. Notches being cut in the trunk of the tree sloping inwards and downwards the resin collects in the cavity and is either permitted to dry on the spot or is collected and dried by the application of heat. It is of all shades from light green to light yellow or white and is usually translucent. Specimens are sometimes seen in which from the dessication having been improperly conducted the resin is more opaque, of a dull green color, and full of air bubbles, presenting the appearance of having undergone a partial fermentation. This resin may be recognised by its cellular appearance and balsamic smell—this latter however (which is of course due to the volatile oil it contains) is gradually lost by long keeping or constant exposure to the air, what is called "East Indian copal" and sold in England as gum *anime* exudes abundantly from this tree. It occurs of all shades of color between pale green and deep yellow, the finest pieces are called *kahroba*, Arabic, Amber, and sold as *amber* in the bazars of Bengal; the resin before it hardens is the Piney varnish of Malabar. Besides the uses already alluded to, candles are made of this resin in Malabar, which Dr. Wight informs us, diffuse in burning an agreeable fragrance, give a fine clear light with little smoke, and consume the wick without snuffing. These candles were at one time introduced into England, but a very high duty having been imposed the trade ceased.

(8501) VATERIA LANCELOTA ? Vateria. A species of vateria is a common timber tree in the Provinces of Tavoy and Mergui. The timber is whiter than hopea, and equally good. Indeed, it is often called white thengan, or white hopea, the woods being only distinguished in commerce by their colour. Wallich in his list of Indian woods mentions *Hopea floribunda* as known at Tavoy by the Burmese name of *tantheya*. The tree called at Tavoy panthcya, is certainly not a species of hopea. Its flowers, in white fragrant panicles, are often seen in the Tavoy bazar, and are very unlike the yellow secund flowers of the Hopea.

(8502) VATERIA LANCEÆFOLIA is the other species, which was described by Dr. Roxburgh from Silhet, where it is called Moal. Like its congener, this also exudes a clear liquid from wounds, &c., in the bark, which soon hardens into an amber-coloured resin. From this the natives distil a dark-coloured and strong-smelling resin called Chooa, and Chova and Gond by the Brahmins, who use it as incense.—*Eng. Cyc.*

(8503) VATERIA ROXBURGHII. Indian gum anime tree. In Hindustan, *Vateria indica* produces a resin which is sometimes called copal in India, and gum anime in England; but it does not appear to be known that in the Tenasserim Provinces, another species of the same genus yields almost a precisely similar resin. When in bloom the tree is quite ornamental, and diffuses the fragrance of its flowers for a great distance around.—*Mason.* Dr. Wight gives figure Vateria Roxburghiana, 26.

(8504) VATICA ROBUSTA.

Saul Hind. | Googilam, Tel.

A wood in great repute, belonging to the *Dipterocarpeæ;* it is most valuable for house ind ship building, Vats for liquids, door frames, ind the rails and battens of doors; it is not suit-d for planks, it twists, shrinks, and warps, vhenever the surface is removed, even after nany years' seasoning. This wood is in general ise for building purposes in the Ganjam and Vizagapatam Districts. "From Colonel Baker's excellent experiments, it appears that, compared vith Teak, its strength is about 1121 to 869. From Major H. Campbell's valuable experiments, inseasoned Saul broke with 1,391lbs. It is inquestionably the most useful grown India imber for engineering purposes," (Jury Reports Great Exhibion.) broke with a weight of 1308 bs.; seasoned saul with 1319 lbs. An another in Tenasserim refers all the species of *Vatica* to the mountains, but they have one hat drops its curious winged fruit from cliffs hat overhang the sea.—*Mason.* Two or three pecies are found in Goomsur forming extenive forests and affording to the inhabitants ncense, dammer and wood oil. Judging from he imperfect specimens collected by Dr. Maxvell and Capt. McPherson, one of them belongs to Roxburgh's genus *Shorea* apparently S. *robusta.* Both these gentlemen mention *Chloroxylon dupada* as being one of them, but his is thought to be a mistake originating n a statement of Dr. Ainslie that this is the otanical name given to the Indian dammer ree by Dr. Buchanan, but which was an error f his arising from his not being aware that seveal trees produce dammer and that his *Chloroxyon Dupada* was already described by Linæus under the generic name of *Vateria.* The Shoreas (Roxb.) or Vaticas (Linn.) and Vaterias ield the solid product called dammer and Piney whilst the produce of the Dipteroarps retains its fluidity and is the " wood il" of the bazars. The Camphor tree of Suatra is a species of *Vateria* (*Shorea camphorira,* Roxb) The Vateria Indica (chloroxylon upada of Buchanan and Ainslie and the Piney narum of the Hindoos) produces a resin reembling Copal, much finer than that procured rom other species, natives of India, the finer pecimens of which are as transparent as amber nd nearly colorless. It is procured by the ery simple process of cutting a notch in the ree sloping inwards and downwards. This is oon filled with the juice, which in a short time ardens by exposure to the air.

(8505) VEGETABLE IVORY, is occasionlly seen in India as the knobs of walking sticks. t is imported into Europe and North America rom the river Magdalina, and in some years no ess than 150 tons of it were imported into Engund, where the nuts may be purchased for a few pence each and even at a cheaper rate, for in August 1854, 1000 were sold for 7 shillings and 6 pence. The Ivory plant is confined to the continent of South America, where it grows between the 9th degree of North and the 8th degree of South latitude and the 70th and 79° of West longitude, and is found in narrow valleys and damp localities from the coast to 3000 feet above the sea. From the kernels or albumen of the fruit, the American, as well as European turners fashion the knobs of walking sticks, the reels of spindles and little toys which are whiter than animal ivory, and equally hard when dry, but soften when placed into water. The plant is supposed to belong to Endlicher's class Spadiciflora and Lindley's alliance Arales, but Martius regards it as the type of a new natural order named Phytelephanteæ. It is called the Ivory Palm.—*Seeman.*

(8506) VEGETABLE KINGDOM. This term is applied collectively to the various forms of Plants, as the terms Animal and Mineral Kingdoms are applied to Animals and Minerals. Several methods have been proposed by DeCandolle and others for giving an idea of the distribution of vegetation over the surface of the globe. In the following remarks we have followed that of Professor Schow, in his 'Notes for a Course of Lectures on the Distribution of Plants.'

1. Region of Saxifrages and Mosses, or the Alpine Artic Flora: temperature 1·75 to 41° Fahr. This corresponds with the hyperborean region of De Candolle and other writers, and comprehends all countries within the polar circle, namely Lapland, the north of Russia and Siberia, Kamtchatka, Labrador, Greenland, and Iceland, and also part of the Scottish and Scandinavian mountains, as well as the mountains of the southern and central parts of Europe, with sufficient elevation to possess an alpine vegetation. This region is characterised by the abundance of mosses and lichens, and of the families *Saxifragaceæ*, *Gentianaceæ*, *Alsinaceæ*, *Saliceæ*, and *Cyperaceæ*. There is an entire absence of tropical families, and only a few plants of the temperate zone. The beech and fir occur in forests, or there is a destitution of trees. Annuals are also scarce, and the blossoms of the flower are large in proportion to the root of the plant, and of a pure colour.

2. Region of the *Umbelliferæ* and *Cruciferæ*: temperature 27·5° to 56·75°. This comprehends the whole of Europe, except those districts which belong to the preceding region, from the Pyrenees, the mountains of the south of France, of Switzerland, and the north of Greece, to the greater part of Siberia, and the country about Mount Caucasus. This region is particularly distinguished from that of the same parallel in north America by the presence of cruciferous and umbelliferous plants. It is not easily distinguished

from the next region, but the *Fungi* abound more, and it approaches the last region in the abundance of *Cyperaceæ* Nearly all its trees are deciduous, and its meadows are exceedingly flourishing. There is a division of the *Compositæ*; the plants belonging to the Cichoraceous division of that order, being found in the northern districts, whilst those belonging to the Cynarocephalous are found in the south of it. The prodominating trees are the Scotch Fir, the Alder, the Beech, the Birch, the Poplar, the Elm, and Lime. The shrubs are the Heaths, the Sloe, &c. The principal cultivated plants are the Wheat, Barley, Oats, Maize, Potatoes, &c; Apple, Pear, Gooseberry, Currant, Vine, Strawberry, Cucumber, Melon, the Cabbage, Turnip, Peas, Beans, and other forms of *Leguminosæ*; Carrots, Hops, Hemp, Flax, &c.

3. The Region of *Labiatæ* and *Caryophyllaceæ*, or the Medieterranaan kingdom: temperature 54·5° to 72·5°. This includes the region of the Mediterranean Sea, limited on the north by the Pyrenees, the Alps, the Balkan, the Caucasus; on the south by the Atlas and the deserts of North Africa; on the east by Taurus. It contains more or less of the orders belonging to the last region; but *Labiatæ*, *Caryophyllaceæ*, *Boraginaceæ*, *Cistaceæ* and *Liliaceæ* abound. A few tropical plants now and then appear amongst them, belonging to the orders *Palmaceæ*, *Terebintaceæ*, and *Lauraceæ* *Solanaceæ* and *Leguminosæ* are more abundant than in the last, evergreens increase, and the vegetation never entirely ceases; but verdant meadows are more rare than in the last. Madeira, Azores, and the Canary Islands, belong to this region, and their Flora approaches to that of tropical Africa. The cultivated plants are similar to the last, to which are added the Olive, Orange, Lemon, Mulberry, Fig. Rice, &c.

4 The region of *Asteraceæ* and *Solidaginaceæ*, or northern North-American kingdom: temperature 9.5° to 59°. It embraces North America from the southern limits of the first kingdom to 36°. N. lat. There are a greater number of *Coniferæ* than in the second kingdom, and there are but few *Umbelliferæ*, *Cruciferæ*, *Cichoraceæ*, and *Cynarocephalaceæ*. There is but little cultivation: where there is any it resembles that of the second kingdom. Whortleberries, Oaks, Firs, Michaelmas Daisies, and Golden Rods are its great characteristics.

5 The Region of *Magnoliaceæ*, or Southern North-American kingdom, between 36° and 30° N. lat: temperature 59° to 72·5°. There is here an approximation to tropical vegetation, as seen in the frequent appearance of the genera *Canna*, *Chamærops* *Yucca*, *Zamia*, *Laurus*, *Bignonia*, *Passiflora*, *Cassia*, *Sapindus*, &c. There are comparatively few plants that are characteristic of the two preceding kingdoms. The Magnolias predominate, and are accompanied with other genera bearing broad shining leaves and large flowers. The cultivated plants are those of the third region, with the exception of the Olive: Rice is more abundant, and in the southern districts the Sugar-Cane is grown.

6. The Region of Camellias, and *Celastraceæ* or Chino-Japanese kingdom. It embraces Japan and Northern China from 30° to 40° N. lat. temperature 54-5° to 68°. Too little is known of this region to enable us to state positively what are its characteristics. Its vegetation is more tropical than European. With Zamas Ginger, Bananas, and Custard-Apples, are found Buckthorns and Honeysuckles, thus giving this region a mixed character. Its cultivated plants in addition to those of the previous regions are the *Cycas* for Sago, the Tea-plant, the Caladium, &c.

7. The Region of *Zingiberaceæ*, or Indian kingdom: temperature 65·75° to 81·5°. This includes the Indian peninsulas east and west of the Ganges, together with the islands between India and Australia. Tropical orders are numerous in this region, as *Palmaceæ*, *Araceæ* *Euphorbiaceæ*, *Bignoniaceæ*, *Byttneriaceæ*, &c. Very few plants belonging to *Cyperaceæ*, *Coniferæ*, *Labiatæ*, *Rosaceæ*, *Ranunculaceæ*, or *Crucifera* are seen. The trees never lose their leaves, and produce large magnificent flowers, and are covered frequently with climbing and parasitical plant. Ginger, Zedoary, Cardamom, Arrowroot, Catechu, Cassia, Cinnamon, Caoutchouc, Tamarinds, Sago, Rice, Cocoa-Nut, Coffee, Cubebs, Cloves, Pepper, Oranges, and Gamboge, are the cultivated and natural productions of this prolific region.

8. The Regions of the Himalaya: temperature 36·5° to 65·75°. It includes the highlands of India, or the mountain terraces lying on the south of the Himalayan range, Kumaon, Nepaul, Bootan, having an elevation of from 4000 to 10,000 feet. The tropical forms of the last kingdom decrease manifestly here, such as *Scitaniaceæ*, *Palmaceæ*, *Cycadaceæ*, &c. European forms are not unfrequent, as *Cyperaceæ*, *Amentaceæ*, *Coniferæ*, *Primulaceæ*, *Rosaceæ*, *Cruciferæ*, &c. The Ferns and *Orchidaceæ* are abundant. The cultivated plants are the corn and fruit of Europe, varying with more tropical productions according to elevation.

9. The Region of *Polynesia* includes the islands between Hindustan and Australia, and has a temperature from 65·75° to 83·75°. This region is similar to the Indian kingdom, and is sometimes included in it. The cultivated plants, in addition to those of the Indian kingdom, are the Bread-Fruit-Tree, the Nutmeg, the Camphor-Tree, and the Cotton-Tree.

10. The Region of Java is little known, and has a vegetation probably similar to the Himalayan region.

11. The Oceania Region, or South Sea Is-

land kingdom, includes all the islands of the South Sea within the tropics, and has a temperature of 72·5° to 81·5°. The flora of these islands is poor, and approximates more closely to that of Asia than to that of Africa, and has some relation to that of Australia. The bread-fruit is the most characteristic production of these islands, but is not confined to them.

12. The region of *Balsomodendra*, or the Arabian kingdom, includes the south westorly mountainous part of the Arabian peninsula. The temparature cannot be stated, but the character of its vegetation is generally tropical, assuming the forms of that of India. The cultivated plants are also principally those of India.

13. The Desert Region includes North Africa south of the Atlas, and the Mediterranean Sea between 15° and 30° N. lat, and the northern part of Arabia. The mean temperature is 72° to 86° It has necessarily a very poor flora, having but few even characteristic genera. It is only cultivated in the oases, where the *Phœnix dactylifera*, the *Sorghum vulgare*, with Wheat and Barley, and some of the fruits of Europe and India, constitute the prominent plants.

15. The Region of tropical Africa includes Africa from 15° N. lat. to the tropic of Capricorn. Temperature 72°5 to 86°. This flora is neither rich nor rare ; it abounds in *Leguminosæ*, *Rubiaceæ*, and *Cyperaceæ*. The *Adansonia* is the characteristic genus.

15. The Region of *Cacti* and *Piperaceæ* includes Mexico and South America to the Amazon River, and to a height of 5000 feet above the level of the sea. Temperature 68° to 83°74. The orders which characterise this region are *Bromeliaceæ*, *Piperaceæ*, *Passifloraceæ* and *Cactaceæ*. The orders which are mostly tropical are here less numerous, whilst extra-tropical orders are more abundant. The most abundant genera are *Phytelephas*, *Kunthia*, *Thouinia*, *Theobroma*, *Guazuma* &c. The cultivated plants of this district are the Maize, *Sorghum vulgare*, *Dioscorea*, *Convolvulus* ; also the Plantain, Cocoa-Nut, Pine-Apple, Tamarind, Cacao, Vanilla, Coffee, Sugar, Tobacco, Cotton, &c.

16. The Region of the Mexican Highlands includes the mountains of Mexico above 5000 feet elevation. Temperature from 65°·75 to 79°·25. In this district the more tropical forms of vegetation, as the Tree-Ferns, the Palms; Passion-Flowers, Euphorbiums, and Pepper, decrease or altogether disappear. The extra tropical forms are more numerous, as the Willow, Oak, Fir, Cypress, Sago, Horehound, Whortleberry, Heath, and various forms of *Umbelliferæ*, *Rosaceæ*, *Caryophyllaceæ*, and *Ranunculaceæ*. The cultivated plants are maize, the European *Cerealia*, and fruits. In the highest mountain-ranges the vegetation has an alpine aspect.

17. The Region of *Cinchonaceæ*. This embraces the Andes from 5000 to 9000 feet in elevation, and between 20° S. lat., and .5° N. lat., having a temperature from 59° to 68°. The extra-tropical forms become very frequent in this region, and only a few tropical forms remain. Some of the most common genera are the *Cinchona*, *Gay-Lussacia*, *Loasa*, *Lilæa*, *Cervantesia* &c. The cultivated plants are very seldom tropical. Maize and coffee are sometimes grown, with European *Cerealia*, and fruits, Potatoes, and *Chenopodium Quinoa*.

18. The Region of Escallonias and Calceolarias includes the Andes at more than 9000 feet above the level of the sea, between 20° S. lat. and 5° N. lat. Temperature 34.25° to 59°. Tropical plants almost entirely disappear in this region, only now and then a straggler appearing ; whilst the forms which distinguish the colder and polar regions become frequent, such as the Lichens, Mosses, Sorrels, Plantagos, Gentians, Currant, Brambles, &c. The most prevalent orders are the Grasses, Heaths, and *Synantheraceæ*. There are no large trees, and a great many shrubs.

19. The West Indian Region, including the West India Islands, with a temperature of 59° to 79.25°. The vegetation of these islands bears the same relation to the continent which that of the Polynesian islands does to China. It is chiefly distinguished by the greater quantity of Ferns and *Orchidaceæ*. The cultivated plants are the same as those of Mexico.

20. The Region of Palms and *Melastomaceæ*, or Brazilian kingdom, including Brazil, or South America, on the East of the Andes, between the equator, and the tropic of Capricorn ; temperature 56° to 83·7°. This region is remarkable for the number of its genera and species, the size of individual trees, the dense forests, and the numerous climbing and parasitical plants. Vegetation seems here to attain its greatest activity and energy. The orders which abound most are *Palmaceæ*, *Homaderaceæ*, *Gesriaceæ*, *Melastomaceæ*, *Sapindaceæ* and, altogether confined to this region, *Vochyaceæ*. The cultivation is very similar to that of Mexico.

21. The Region of Woody *Compositæ*. In South America, on the east of the Andes from the tropic of Capricorn to 40° S. lat : temperature 59° to 74·75°. There are but few tropical plants in this region, and extra tropical plants, especially European forms, are abundant, more than half being common to this region and Europe. The Woody *Compositæ* abound. This region consists chiefly of plains (pampas), which for hundreds of miles present almost the same vegetation, consisting chiefly of Thistles and Grasses. Wheat, the Vine, and the Peach, are cultivated.

22. The Antarctic Region includes the south-westerly part of Patagonia, Tierra del Fuego, between 50° and 55° S. lat. : temperature 41° to 47·5°. In this region there are no tropical plants, and its vegetation resembles in a great

measure the North-European flora (region 2). In some of the genera there is an approach to the South African and Australian flora.

23. The Region of Stapelias and Mesembryanthemums. This embraces South Africa from the tropic to 35° S. lat. : temperature 54·5° to 72·5°. The vegetation of this region is not luxuriant, but it is very rich in forms. There are no dense forests nor climbers, but many succulent plants. The orders *Restiaceæ*, *Iridaceæ*, *Proteaceæ*, *Ericaceæ*, *Ficoiduceæ*, *Bruniaceæ*, *Diosmaceæ*, *Geraniaceæ*, *Oxalidaceæ*, and *Polygalaceæ*, embrace its characteristic vegetation. On the sandy coasts the genera *Stapelia*, *Mesembryanthemum*, and *Diosma*, are found, and on the mountains *Protea*, *Erica*, and *Brassula* The cultivated plants are those of Europe, with the *Musa Paradisiaca*. *Convolvulus Batatas*, the Tamarind, and *Sorghum Caffrorum*.

24. The Region of *Eucalypti* and *Epacridaceæ*. It includes extra-tropical Australia and Van Diemen's Land : temperature 42°25 to 72°·5' Vegetation is not abundant in this region ; but this deficiency is compensated by the variety and peculiarity of its forms. The most abundant of the trees are the *Eucalypti*, which form three-fourths of all the woods. Next come the genera of *Protaceæ*, *Banksia*, *Hakea*, *Dryandra*, *Grevillæa*, &c. : and next to these follow *Epacridaceæ*, *Diosmaceæ*, and *Casuaraceæ*. Its cultivated plants are all European.

25. The Region of New Zealand includes the two New Zealand isles : temperate, One-half of the species are European. The vegetation is not characterised by the prevalence of large groups. Some of the genera approximate the South African flora, and some the Australian. (The following works should be consulted on the geography of plants :—Linnæus, *Stationes Plantarum* ; Humboldt and Bonpland, *Essai sur la Geographie des Plantes* ; Humboldt *De Distributione et Geographica Plantarum* ; Brown, *General Remarks on the Botany of Terra Australis* ; Schouw, *Grundzuge einer Allgemeinen Pflanzen-Geographie* ; Meyen, *Grundriss der Pflanizen-Geographie* ; Bischoff, *Lehrbuch der Batanik* ; Hooker, *in* Murray's *Dictionary of Geography* ; De Candolle, art. *Geographie des Plants—Dict. des Sciences Naturelles* ; Lindley, *Int. Bot.* 2nd, ed. ; Meyen, *Geography of Plants*, translated for Ray Society by Miss Johnston ; Balfour, *Class-Book of Botany* ; Johnston, *Physical Atlas*.

(8507) VEGETABLE MARROW, or SQUASH.

Suppara Roomro, Hind.

This is a very delicate vegetable of the gourd species. The crooked-necked, when about six inches long, is well flavoured, but soon gets hard and stringy. The pear-shaped is the best of any, but must be dressed when young. Propagation only by seed, and the plants should never be removed, but remain where sown, only thinning the weakly ones. The soil should be, a rich loam, the same as for cucumbers. Train the plant on sticks. It is often necessary to fertilize the female blossoms, by approaching the anthers of the male flower when charged with pollen.—*Riddell.*

(8508) VEGETABLES OF SOUTHERN INDIA. Mr. Jaffrey gives the following list.

Abelmoschus esculentus.
Achyranthes aspera.
Æschynomene aspera.
Agati grandiflora.
Alternanthera sessilis
Amarantus tenuifolius.
,, spinosus.
,, campestris.
,, tristis.
,, frumentaceus.
,, polygamus.
,, oleraceus.
,, atropurpureus.
Amorpophaluscampanulatus.
Andropogon esculentum.
.Erua lanata.
Artocarpus integrfolius.
Asystasia Coromandeliana.
Atriplex heteranthera.

Batatas edulis.
Bauhinia albida.
,, purpurea.
Bergera Kœnigii.
Boerhavia procumbens.
Bryonia coccinia,....
Byttneria herbacea.

Caladium esculentum.
Capsella bursa-pastoris.
Capsicum frutescens .
,, minimum.
Capparis brevispina.
Caralluma adescendens.
Carica papaya.
Cleome pentaphylla.
Cocos nucifera.
Commelina communis.
Coriandrum sativum
Cucurbita maxima.
,, citrullus.
,, ovifera.
Cucumus usitata
Cyamopsis psoraloides.
Cynodon dactylon.

Dillenia speciosa.
Desmanthus natans.
Dioscorea purpurea.
,, aculeata.
Dolichos ensiformis.

Erythroxylon areolatum.
Euphorbia pilulifera,
Emblica officinalis.

Ficus racemosa.
Foeniculum vulgare.

Glinus trianthemoides,

Gisekia pharnaceoides.

Hibiscus sabdariffa
,, surattensis.
Hoya viridiflora.

Ipomœa separia.
,, reptans.
,, reniformis.

Lablab vulgaris.
Lagenaria vulgaris.
,, pipo.
Leptadenia reticulata.
Leucas aspera.

Mangifera Indica.
Momordica charantia var. muricata.
Momordica charantia.
Morinda umbellata.
Moringa pterygospermum.
Musa sapientum.

Nelumbium speciosum.

Ocymum villosum.
Oxalis corniculatus.

Pisonia morindifolia.
Portulacca oleracea.
Portulacca quadrifida.
Premna integrifolia.
,, serratifolia.
Psophocarpus tetragonolobus.

Rivea fragrans.
Rothia trifoliata.
Rumex vesicaria.

Salsola Indica.
Solanum incertum.
,, melongena.
,, Lycopersicum.
,, torvum.
Sonchus oleraceus.
Spinacia oleracea.
Spondias mangifera.
Stellaria media.
Suæda Indica.

Tamarindus Indica.
Trianthema obcordata.
Tribulus terrestris.
Trichosanthes anguina.

Vitis quadrangularis,

Webera tetrandra.

Zizyphus jujuba.

Jaffrey, p. 63.

There is a great variety of vegetables indigenous or cultivated in the Tenasserim Provinces; but the best are scarce, and rarely for sale in the bazars. Nearly every plant produces a vegetable for the natives. The Burman books say, there are ten kinds of vegetables, or pot herbs, corresponding to the parts of a plant that furnish them.—*Mason.*

(8509) VEGETABLE PRODUCTIONS OF COMMERCE. Professor Solly, in one of the series of Lectures on the results of the Great Exhibition, delivered before the Society of Arts, early in 1852, made some practical remarks bearing on the subject :—

" If (he said) you were to place before any manufacturer specimens of all the substances which could be employed in his particular manufacture, and if you could tell him from whence each could be procured, its cost, the quantities in which he might obtain it, and its physical and chemical properties, he would soon be able to select for himself the one best suited for his purposes. This, however, has never happened in relation to any one art; in every case manufacturers have had to make the best of the materials which chance or accident has brought before them. It is strange and startling, but nevertheless perfectly true, that even at the present time there are many excellent and abundant productions of nature with which not only our manufacturers, but, in some instances, even our men of science, are wholly unacquainted. *There is not a single book published which gives even tolerably complete information on any one of the different classes of vegetable raw produce at present under our consideration.* The truth of these remarks will be felt strongly by any one who takes the trouble to examine any of these great divisions of raw materials. He will obtain tolerably complete information respecting most of those substances which are known in trade and commerce; but of the greater number of those not known to the broker, he will learn little or nothing. Men of science, for the most part, look down upon such knowledge. The practical use of any substances, the wants and difficulties of the manufacturer, are regarded as mere trade questions, vulgar and low—simple questions of money. On the other hand, mere men of business do not feel the want of such knowledge, because, in the first place, they are ignorant of its existence, and secondly, because they do not see how it could aid them or their business; and if it should happen that an enterprising manufacturer desires to learn something of the cultivation and production of the raw material with which he works, he generally finds it quite impossible to obtain any really sound and useful information. In such cases, if he is a man of energy and of capital, he often is at the cost of sending out a perfectly qualified person to some distant part of the globe, to learn for him those practical details which he desires to know. This is no uncommon thing; and many cases might be stated, showing the great advantages which have arisen to those who have thus gained a march upon their neighbours."

That quaint old English poet, Herbert, who flourished in the fifteenth century, in a short poem on "Providence," has graphically described, in his unique vein, the sentiment which forces itself upon us in view of the numerous discoveries of the age in which we live :—

" All countries have enough to serve their need.

* * * *

——The Indian nut alone
Is clothing, meat and trencher, drink and can,
Boat, cable, sail, and needle, all in one."

"The addition (it has been well observed) of even a single flower, or an ornamental shrub, to those which we already possess, is not to be regarded as a matter below the care of industry and science. The more we extend our researches into the productions of nature, the more are our minds elevated by contemplating the variety as well as the exceeding beauty and excellence of the works of the Creator."-*Simmonds.*

(8510) VEGETABLE WAX was sent from Shanghae in China, from St. Domingo in the Northern parts of which the plant is indigenous, and a remarkable specimen from Japan. This substance from its high melting point and other physical characteristics has of late attracted a good deal of attention, it is admirably suited as a material for the manufacture of candles.—*Simmonds' Commercial Products, p.* 540.

(8511) VEKKALI TREE WOOD.

Vekkali maram, TAM.

A serviceable variegated hard close-grained wood employed by the Natives in house-building and also for making doors, windows, handles of instruments, &c. &c.—*Ains. Mat. Med. p.* 206.

(8512) VELASSALU. The Tamul name of the Ceylon White Iron-wood, which grows to about fourteen inches in diameter, and ten feet high. It is used by the natives for huts, poles, &c. and where strength and durability are required.—*Edye, Ceylon.*

(8513) VELATTE, the Tamul name, Ballangu, in Portuguese, of a Ceylon tree, which grows to about fourteen inches in diameter, and eight or ten feet in height. It is remarkably strong, and is used by native carpenters in vessels. It produces a fruit which is eaten by the natives.—*Edye, Ceylon.*

(8514) VELEANA, the Tamil name of a Ceylon tree which grows to about twelve inches in diameter, and eighteen feet in height. In appearance it resembles English oak. The native carpenters use it in boats and vessels' frames, knees, &c.—*Edye, Ceylon.*

(8515) VELLE AERE, the Tamil name of a Ceylon tree which is white Aere. It grows to about twelve or eighteen inches in diameter, and twenty feet in height. It is a light wood, and is generally converted into catamarans, being considered useful for that purpose only.—*Edye. Ceylon.*

(8516) VELLE NEALEA, the Malayala name of a Ceylon tree which grows to about ten inches in diameter, and ten feet in height. The branches of this tree are very strong, and are used for the frames of native vessels.—*Edye, Ceylon.*

(8517) VELL VIEN, the Tamil name of a Ceylon tree which is about fourteen inches in diameter, and eight feet in height. Its strength and durability lead the natives to prefer it to other wood for the purpose of supports to huts. —*Edye. Ceylon.*

(8518) VELLUM. A fine, white, smooth, kind of parchment, made of calfs-skin.—*Faulkner.*

(8519) VELVET.

Velours, Fr. | Mukhmull, Guz. Hind.
Sammet, Ger. | Velluto, It.

A beautiful silken fabric, having a soft shag or pile on the outside. Velvet is also made of cotton, a strong kind of which called *Velveteen,* is used for men's apparel.—*Faulkner.*

(8520) VENDELLIA, a genus of plants belonging to the natural order *Scrophneariaceæ.* The species are natives of warm parts of the world such as India, Burma, China, and Brazil, forming smooth or hairy herbs, with tetragonal stems; leaves opposite, usually toothed.

(8521) VENERIDÆ, a family of Conchiferous *Mollusca.*

The genus *Venus* of Linnæus was arranged by him in the second section (*Bivalvia : Conchæ*) of his *Testacea Mollusca Simplicia, obtecta Testa Calcarea,* between *Donax* and *Spondylus.*

Dr. J. E. Gray places the *Veneridæ* as the first family of his order *Phyllopoda,* with the following genera :—*Artemis, Cytherea, Meroe, Gratelupia, Trigona, Chione, Circe, Dosina, Mercenaria, Anomalocardia, Cypreia, Venus, Tapes, Venerupis,* and *Clementia.*

The *Veneridæ* are immediately followed in Dr. Gray's arrangement by the *Cyrenidæ,* which comprise the following genera :—*Cyrena, Gelonia, Velorita, Cyclas,* and *Pisidium.*

The *Cardiadæ* immediately follow. Woodward, in his 'Manual,' places the *Veneridæ* between the *Cyprinidæ* and *Mactridæ,* and includes in it the following genera :—*Venus, Cytherea, Meroe, Trigona, Artemis, Lucinopsis, Tapes, Venerupis, Petricola,* and *Glaucomya.* Our limits will only permit the illustration of this family by the notice of a few Asiatic genera.

(8522) *Cyrena.*

(8523) *C. fuscata* is brownish-green, with numerous transverse subimbricate furrows; violet within and at the umbones; the lateral teeth very much elongated transversely and dentilated. It is a native of the Chinese rivers and those of the Levant.

(8524) *Megadesma.*

(8525) *M. radiatum* (*Galathea radiata,* Lam; *Potamophila radiata,* Sow.) Under the epidermis milk-white, marked with violet towards its base, and ornamented with violet rays, generally from two to four in number. It is found in the rivers of Ceylon and of India.

Cytherea occurs fossil below the Chalk.

Venus.—Shell equivalve, inequilateral, transverse, or suborbicular. Three cardinal teeth, approximated in each valve; the lateral ones diverging at the umbo. External ligament covering the external anterior fissure.

The number of species recorded by M. Deshayes in his Tables is 11 recent and 43 fossil (tertiary.) Of these *V. verrucosa, V. plicata, V. gallina, V. decussata, V. radiata, V. Brongniarti, V. dysera, V. geographica,* and *V. paphia,* are noted as recent and fossil (tertiary). —*Eng. Cyc.*

(8526) VENGA MARAM.

Yepi ; Vriksha, Can. | Yapa Chettoo, Tel.

This is reckoned by the Natives of the Circars a very useful wood, it is of a reddish colour and is employed in making doors and windows and other common purposes. It is in common use both for building and for furniture in the Masulipatam district, it is a very heavy wood but not strong, when used for rafters, it should be cut very broad in comparison to its thickness.—*Rohde, M.S.S.*

(8527) VENGULA CYAM, the Tamil name of a Ceylon tree of little value. It grows to about twelve inches in diameter, and six feet high; and produces a fruit which is not made use of.—*Edye, Ceylon.*

(8528) VENTILAGO, a genus of Plants consisting of only a single species, belonging to the natural order *Rhamnaceæ.* The calyx is 5-parted; the corolla 5-petalled; stamens 5; germ 2-celled, hid in the crenulated flat disc; style 2-cleft. Samara half superior, globose, long-winged, 1-seeded; embryo erect with perisperm. The species *V. maderaspatana* is common in different parts of India, from the peninsula to the north-western provinces; it is also found in the Indian islands, as it is figured and described (Rumph., 'Herb. Amb.,' 5. t, 2) by the name of *Funis viminalis.* It forms a large climbing shrub with stiff branches; is often diœcious, with flowers having an offensive smell, not unlike that of *Sterculia fœtida.*—*Eng Cyc.*

(8529) VERAETAL, the Tamil name of a Ceylon tree which grows to about fourteen inches in diameter, and eight feet high. It resembles mahogany, but is capable of a more brilliant polish; the natives use it for superior purposes. It produces a kind of fruit which is of little use. —*Edye, Ceylon.*

(8530) VERAM PELOW, the Malayala and Tamil name of a Ceylon tree known by that of Jackwood. This tree is common throughout India, and is of great value to the natives, its fruit and nuts forming a considerable part of their food. The wood when cut is yellow, but, when exposed to the air, turns as dark as mahogany, to which it is superior in brilliancy. It is generally used in articles of furniture for the Europeans, and for house-work, and is considered handsome : the largest tree of this kind which I have seen was about three feet in diameter, and from thirty to thirty-five feet high. In Canara, this was the wood which Tipu Sultan used for his vessels at Honore, where his naval depot was formed.—*Edye, Ceylon.*

(8531) VERATRUM NIGRUM. MELANTHACEÆ. This genus takes its name from the dark colour of its roots. The flowers are mostly white, dark purple, and green. It is cultivated in a rich garden soil by seed, or dividing the roots, which contain powerful medicinal properties.—*Riddell.*

(8532) VERBENACEÆ, *Verbens*, a natural order of Exogenous Plants. The species are trees or shrubs, sometimes only herbaceous plants, with generally opposite, simple, or compound leaves without stipules. The flowers are in opposite corymbs or spiked alternately, sometimes in dense heads, and very seldom axillary or solitary. The calyx is tubular, persistent, inferior ; the corolla is hypogynous, monopetalous, tubular, deciduous, generally with an irregular limb ; the stamens 4, didynamous, seldom equal, occasionally 2 ; ovary 2-4-celled ; ovules erect or pendulous, solitary or twin ; style 1 ; stigma bifid or undivided ; fruit nucamentaceous, sometimes berried, composed of two or four, nucules in a state of adhesion ; seeds erect or pendulous, albumen none, or in very small quantity ; embryo always erect. (Lindley.) The great difference between these plants and those of *Lamiaceæ* or *Labiatæ* consists in their concrete carpels, terminal style, and the absence of oil-glands from their leaves.

(8533) VERBENA, a genus of Plants, the type of the natural order *Verbenaceæ*. Most of the species of this genus are weeds, and are generally inhabitants of Europe and North America. The genus is known by a tubular calyx with 5 teeth, one of them generally shorter than the rest ; a tubular corolla with the limb rather unequal, 5-cleft ; the stamens included, and sometimes only 2 ; the seeds 2 or 4, inclosed in a thin evanescent pericarp.—*Eng. Cyc.*

These pretty little flowering plants do not endure the heat, require shelter and good drainage during the hot months. Propagated by layers and cuttings.—*Jaffrey.*

(8534) VERBENA AUBLETIA, Rose-coloured Vervain, is a native of North America, in Georgia and the Carolinas, and was first brought to Europe in 1774. It is known by its fine pink or crimson flowers.—*Eng. Cyc.*

(8535) VERBENA OFFICINALIS. Common Vervain, has 4 stamens with an erect somewhat hispid stem ; the leaves lanceolate, inciso-serrate, or trifid, with the segments cut rough ; the spikes filiform, somewhat panicled, and the flowers rather remote. This plant is common in England. It is not found in Ireland. It is an inhabitant also of Australia. This is the 'holy herb,' of Dioscorides, who ascribed great powers to it, especially in incantations, In most countries where it grows it seems to have been invested with extraordinary powers. It at one time entered into the composition of various charms and love-philters, and has even now a popular reputation for predisposing persons favourably towards those who administer a dose to them.—*Eng. Cyc.* It is a native of the warm parts of Europe, this plant is described as astringent, febrifuge, &c. but has fallen into just neglect. Still among the ancient Greeks and Gauls it held the highest place in popular estimation ; it was used to purify the altars, and formed the crowns of heralds and ambassadors. The Druids gathered it with the same marks of veneration as the misseltoe, next to which it was revered. Formerly employed extensively as a medicine it was also the base of numerous philters, or love potions, and hence derived its name of *Veneris vena*, or source of love.—*O'Shaughnessy, p.* 484. It is well known for its strong aromatic lemon scent. It grows from cuttings or layers, and no doubt would also from seed, as it blossoms freely.—*Riddell.*

(8536) VERBENA TRIPHYLLA. THE LEMON SCENTED VERBENA.

Peela-Bhungara DUK.

Lemon-Scented Vervain, has panicled spikes with minutely distantly-toothed leaves, three in a whorl ; stem shrubby. This plant is a native of Chili. It is used on the continent for making an infusion, which, when cold, is administered as a cooling drink in fevers, slight catarrhs, &c. *Eng. Cyc. Riddell.*

(8537) VERDA CANARA, the Tamil name of a Ceylon tree which grows to about twenty inches in diameter, and from forty to sixty feet high At times some of the country vessels get their masts from this tree : it is not durable or strong.—*Edye, Ceylon,*

(8538) VERDIGRIS. SUB-ACETATE OF COPPER.

Zungar, ARAB.
Jingal, CASH.
Vert-de-gris, FR.
Grunspan, GER.
Chungal, GUZ. HIND.
Verderame, IT.
Cupri-subacetas, LAT.
Sennang,-MAL.
Zungar, PERS.
Jar. RUS.
Cardenillo, Verdete, Verdegris, SP.
Pittalata, SANS.
Vungalap-patchei, TAM.
Zenghalic-patse, TEL.

A kind of rust of copper, of a beautiful bluish green colour, formed from the corrosion of copper by fermented vegetables. It is extensively used by painters, and in dyeing; and to some extent in medicine —*Faulkner.*

(8539) VERDITER. A blue pigment, generally made by decomposing a solution of sulphate of copper, with the addition of chalk.—*Faulkner.*

(8540) VERJUICE.

Verjus, Fr.	Agresto. It.
Agrest. Ger.	Agraz, Sp.

A kind of harsh vinegar, made of the expressed juice of the wild-apple or crab. The term is also applied to the expressed juice of unripe grapes.—*Faulkner.*

(8541) VERMICELLI.

Meelneepen, Proppen, Dut.	Save, Guz. Hind.
Vermicelli, Fr.	Vermicelli, Tagliolini, It.
	Alterias Sp.
Nudeln, Ger.	Seme Tam. Tel.

A thready paste, formed of flour and water used in soups, &c. Indian vermicelli is eaten in a boiled state, mixed with sugar and milk.—*Faulkner. Vermicelli, or Vermickelly* is an Italian composition of various edible articles, reduced to a paste, and formed into slender wormlike pieces, from whence its name. *Locksoy* is a kind of Vermicelli, prepared from rice at Cochin China, and thence exported in considerable quantity to Japan and China, where it is much esteemed. It is transparent, and gives a consistence to soup. *Chinese Locksoy* is opaque, and less esteemed.—*Des. Comp.*

(8542) VERNANGU, the Tamil name of a Ceylon tree which is also named mast-wood. It is light, and is used by the natives for the masts and yards of small vessels. It grows to about twenty inches in diameter, and from twenty to forty feet in height. It produces a fruit or seed similar to that of the Peon.—*Edye, Ceylon.*

(8543) VERNICIA, a name applied by Loureiro to a Plant of Cochin-China, which is well known as yielding an oil, and which belongs to the same genus as another plant, also yielding an oil, in China and Japan. By Thunberg the latter plant was called *Dryandra*, but that name being appropriated to a genus of *Proteacea*, these oil-trees are now referred to the genus *Elæococca* of Commerson. This genus belongs to the natural order *Euphorbiaceæ. E. verrucosa* the *Dryandra oleifera* of Lamarck, and the *D. cordata* of Thunberg, is a native of Japan, where, he states, it is called Abrassin: the oil expressed from its seeds is used both as an article of diet and for affording light. The Chinese are said to call the oil Mouyeou, and the fruit from which it is obtained Mouyou. The tree cultivated in Bourbon is there called Arbre d'Huile, where an oil is likewise obtained by submitting the almonds of the seeds to pressure. *E. montana*, the *Vernicia montana* of Loureiro, is a native of China and Cochin-China: it yields a clear yellowish fatty oil, which is employed to

protect wood from the influence of air and water It is sometimes mixed with the real varnish o those countries, which it makes more liquid, bu less valuable as a resin.—*Eng. Cyc.*

(8544) VERNONIA, named after W. Vernon a genus of Plants belonging to the natural ord *Compositæ. Vernonia* (*Serratula*, Roxb.) *anthelmintica* is a pretty, large, erect, annual species common on dry uncultivated ground and rubbish in different parts of India, flowering during the cold season. The dark-coloured seed are extremely bitter, and considered powerfully anthelmintic. They are also employed as an ingredient in compounds prescribed in snake-bites.—*Eng Cyc.* Dr. Wight gives Vernoni conyzoides, 829, 1376; multiflora, 1084; Neilgherrensis, 1078; pectiniformis, 1077; salviæfolia, 1072; and *Wightiana*, 1079.

(8545) VERNONIA ANTHELMINTICA, Purple Fleabane, Linn.

Caat Siragum, Tam.	Adivie Zeelacara, Tel.
Kalie Zeerie, Duk.	Kanuna Zeeraka, Sans.

The Oil.

Wild cummin seed Oil, Eng.	Caat seeragum yennai, Tam.

The seeds are extremely bitter, small, and dark coloured. They are considered as powerfully anthelmintic, and are also an ingredient of a compound powder which is occasionally prescribed in cases of snake bites. Rheede tells us that an infusion of them is given on the Malabar coast, for coughs and in flatulencies. See Hort. Mal. part 2d. p. 40.—*Ains Mat. Med. p.* 74. Amongst new fibres appears a sample of Vernonia anthelmintica. It is rather hard but this may possibly be the result of bad cleaning. —*M. E. J. R.*

(8546) VERNONIACEÆ, a tribe of Plants belonging to the natural order *Compositæ.* They are distinguished from *Lactuces* by their corolla, which is not ligulate, and from every other tribe by their style, which is the same as that possessed by *Lactuceæ.* There are several genera of plants belonging to this tribe, which are chiefly inhabitants of America: there are a few in Asia and Africa, but none in Europe.—*Eng. Cyc.*

(8547) VERONICA, a genus of Plants belonging to the natural order *Scrophulariaceæ.* The species consist of herbs, undershrubs, or shrubs, with opposite, alternate, or verticillate leaves. The flowers are of a blue, white, or red colour and are arranged in spikes or racemes; calyx is campanulate or compressed, 4-5-parted; the corolla rotate, with a very short tube, a 4-parted spreading limb; all the segments entire, the upper one the broadest; the stamens are 2, situated at the sides of the upper segment of the corolla, diverging: anthers 2-celled; stigmas hardly thickened. The fruit a capsule, with a septum in the middle or bipartible. The species of the genus are exceedingly numerous; they are distributed over all parts of the world, and are specially abundant in temperate climates. The flora of Great Britain contains about 20 species. —*Eng. Cyc.*

(8548) VERONICA. The species of this genus, are common pretty annuals, with blue flowers —cultivated in any good garden soil by seed, or division of the roots.—*Eng. Cyc.*

(8549) VERONICA BECCABUNGA. SPEEDWELL. A favourite popular remedy in Europe in coughs,chronic visceral affections, and dyspepsia. It contains a little tannic acid and mucilage, but no more remarkable ingredient. It is no longer employed in regular medical practice. —*O'Shaughnessy, p.* 478.

(8550) VERONICA OFFICINALIS. A similar plant, is officinal in the French Codex There are several Indian species.—*O'Shaughnessy, page* 478.

(8551)VERONICA SPICATA, Spiked Speedwell, has its flowers on a spiked raceme.—*Eng. Cyc.*

(8552) VESPA MAGNIFICA, *Sm.* An enormous hornet nearly two inches long was brought to Dr. Hooker at Choongtam in Sikkim alive in a cleft-stick, lolling out its great thorn-like sting, from which drops of a milky poison distilled: its sting is said to produce fatal fevers in men and cattle, which may very well be the case, judging from that of a smaller kind, which left great pain in his hand for two days, while a feeling of numbness remained in the arm for several weeks. It is called " *Vok*" by the Lepchas the common name for any bee : its larvæ are said to be greedily eaten, as are those of various allied insects.—*Hooker, Him. Jour. Vol.* II. *p.* 26.

(8553) VESPIDÆ, a family of Insects belonging to the order *Hymenoptera.* It comprises the species of the genus *Vespa* of Linnæus, of which the common Wasp and the Hornet are familiar examples. They were formed into a family by Latreille, under the name of *Diploptera,* afterwards changed into *Diplopteryga* by Kirby. They form the third and last division of the first sub-section (*Prædones*), of the second section (*Aculeata*) of *Hymenoptera,* in Westwood's revision of Latreille's arrangement. When at rest they fold their wings throughout their entire length, whence their distinctive appellation. The wings of all the insects of the family have a similar neuration, their eyes are lunate, and there are glands at the extremity of the labrum. The four wings have one marginal and three perfect submarginal cells, with an incomplete terminal submarginal cell. Among the Wasps are insects of the most dissimilar habits ; some solitary, others living in societies, some phytophagous others carnivorous. Such as are social rival the bees in the complicated instincts which regulate their societies. At first sight these great differences of manners would seem to point to a classification superior to that founded on such unimportant characters as the folding of the wings, &c. But when we find on further inquiry that the latter apparently insignificant distinctions correspond to essential modifications of structure common to all the insects of the family, we are led to conclude that among the Wasps, structure, and not economy, is the real source of essential character.

The Solitary Wasps, each species of which comprises males and females only, constitute the family *Eumenidæ.* The genera *Eumenes* and *Odynerus* belong to it. The habits of the Solitary Wasps are intersting. Reaumur informs us that the *Odynerus murarius* (*Vesna muraria*) of Linnæus makes a hole several inches deep in the sand, or in the sides of walls, constructing a tube of earthy paste, at first straight, and then curved at its entrance. In this burrow it constructs its cells, and deposits in the cavity of the interior cell from 8 to 12 little green caterpillars arranging them spirally in layers above each other. In the midst of these it deposits its eggs, then closes the mouth of the hole with the materials of the tube, which it had used as a sort of scaffold. The larvæ when hatched feed upon the caterpillars. The Social Wasps constitute the restricted family of *Vespidæ* of Westwood, the *Polistides* of Saint Fargeau. They live in numerous societies, consisting of males, females, and neuters, which are temporary, being dissolved at the approach of winter. The mandibles of the *Vespidæ* proper are not longer than broad, and are broadly and obliquely truncated at their extremities.—*Eng. Cyc.*

(8554) VIBURNUM, a genus of plants belonging to the natural order *Caprifoliaceæ.* The species consist of shrubs with opposite petiolate leaves and corymbose flowers. The limb of the calyx is 5-cleft, permanent ; the corolla rotate, subcampanulate, and tubular ; the fruit a berry, ovate or globose, with 1 seed by abortion, and crowned by the calycine teeth. The species are natives of Europe, America, and Asia, and are of easy culture in British gardens. Some of them were known to the Greeks and Romans, though the species have not been always identified —*Eng. Cyc.* All the varieties of Laurustinus are hardy shrubs, are evergreen, and bear the climate of Great Britain well ; most of them blossom from November till April, and sometimes during May and June.—*Eng. Cyc.* Dr. Wight gives Virburnum acuminatum, 1021 ; capitellatum, 1022 ; hebanthum, 1023 ; *lantana,* 1024 ; *opulus,* 1024 ; Wightianum, 1024.

(8555) VIBURNUM PLICATUM, and *V. macrocephalum* two gorgeous Chinese plants were sent to Chiswick in 845.—*Fortune's Tea districts, page* 17.

(8556) VICIA, a genus of Plants belonging to the natural order *Leguminosæ.* The species are usually climbing herbs with abruptly pinnate leaves, with many pairs of leaflets ; the common petiole terminating in a tendril at the apex, which is mostly branched; the stipules are semi-sagittate in form, and the peduncles axillary, 1- or many-flowered; the calyx is tubular, 5-cleft or 5-toothed, the two upper teeth shortest; the corolla papilionaceous: the stamens diadelphous; the style filiform, being at right angles with the ovary, villous on the upper side, and on the under side beneath the apex; the legume 1-celled, many-seeded, oblong; the seeds with a lateral oval or linear hilum. The species of this genus are very numerous.—*Eng. Cyc.*

(8557) VICIA BIENNIS, Biennial Vetch, has about 12 lanceolate glabrous leaflets.

(8558) VICIA BITHYNICA, Rough Podded Purple Vetch, has stalked mostly solitary flowers.—*Eng. Cyc.*

(8559) VICIA CRACCA, Tufted Vetch.

(8560) VICIA LUTEA, Rough-Podded Yellow Vetch, has sessile solitary flowers.

(8561) VICIA PISIFORMIS, Pea-like Vetch is a quite smooth plant

(8562) VICIA SATIVA, common Vetch, or Tare, has leaves with tendrils.

(8563) VICIA SEPIUM, Bush-Vetch, has flowers mostly in fours, somewhat stalked.

(8564) VICIA SYLVATICA, the Wood Vetch, has many flowered peduncles longer than the leaves

(8565) VICOA, a genus of Plants belonging to the natural order *Compositæ*, and sub-tribe *Inuleæ.*—*Eng. Cyc.* Dr Wight gives Vicoa Indica, 1148

(8566) VICTORIA REGIA. NYMPHÆACEÆ.—"This beautiful water lily has been successfully raised in the Botanical garden at Calcutta from seed sent by Dr. Wallich from England on the 9th of September 1851. It was received and sown in the garden on the 6th of November following, where it lay in a dormant state until the 23d of April 1853. On the 13th of May same year, the seedling had made a healthy growth and was transferred on that date to the mound prepared for it in the tank. The largest leaf when planted out was little more than three inches in diameter. The total number of leaves produced up to the 5th of September were forty-four, fifteen of which were on the plant in different stages of development, when the first flower had made its appearance on the surface of the water, the largest leaf produced up to that time measured 4 feet 5½ inches in diameter. The first flower-bud appeared partly above the water on the morning of the 6th September and by sunset the same evening had partly expanded the flower which closed up the next morning, and finally opened again at sun-set the same evening."—*Journal of the Agri Horticultural Society, Cal. Vol.* 8, 1853. *Riddell.*

(8567) VILLARSIA, a genus of Plants belonging to the natural order *Gentianaceæ*, named after Villars, a French botanist. It has a 5-parted calyx: a subrotate corolla with spreading limb, the segments with a flat disc; 2-lobed stigmas, the lobes toothed; 5 hypogynous glands; a 1-celled 2-valved or valveless capsule; seeds naked, or girted with a membranous margin. There are about 16 species of this genus. These are either aquatic or marsh plants, with alternate entire leaves and yellow flowers. They are inhabitants of all parts of the world. One only is a native of Europe—*Eng Cyc.*

(8568) VILLARSIA INDICA, aristata, and nymphæoides occur in every part of India, and afford a good bitter.—*O'Sh. p.* 450.

(8569) VILLARSIA NYMPHÆOIDES, Nymphæa-like Villarsia, is a floating plant, with orbicular-cordate leaves; the peduncles single-flowered, and aggregate; the segments of the corolla ciliate. It is a native of Denmark, Holland, Sweden, Germany, Piedmont, and of Siberia. It is found in ditches and slow-running streams. It is also a native of Great Britain, though compratively a rare plant. It is found in the Thames, in the recesses of the shores near Waltom Bridge, near Botley Bridge, Godstow Bridge, and Hinksey Ferry. It occurs also in the fens of Lincolnshire and in Yorkshire. It is a beautiful plant, and may be easily cultivated. It has a large yellow flower, which is curiously plaited. It is a very abundant plant in Holland, frequently covering large tracts of the canals with its beautiful yellow flowers and dark-green leaves. --*Eng. Cyc. Vellarsia Nymphæoides* grows in every part of Hindoostan; in Cashmere it vegetates on the lakes, and is given, as food, to cows, in the belief that it increases their milk.—*Thirty five years in the East by Dr. Honig. p.* 364.

(8570) VINCA (from 'vinco,' to bind), a genus of Plants belonging to the natural order *Apocynaceæ.* It has a salver-shaped corolla, with the tube longer than the calyx, and the throat bearded; the segments of the limb flat, oblique, 5-lobed, truncate at the apex; 5 stamens inserted in the throat inclosed with short filaments. Five or six species of this genus have been described; they are creeping, suffruticose, or herbaceous plants, with smooth shining opposite leaves, with blue, purple, or white flowers, seated on solitary axillary alternate peduncles. They are natives of Europe, in shady places.—*Eng. Cyc.*

(8571) VINCA MAJOR, Greater Periwinkle. Its flowers are of a fine purple-blue colour, and are larger than those of any other species. The English name, Periwinkle, seems to be derived from the French, Pervenche. In Chaucer's time it was called Perwinke:—

> "There sprang the violet al newe,
> And fresh perwinke rich of hewe."

In olden times great virtues were attributed to the Periwinkle; amongst other things, Cul-pepper says, "the leaves of the Periwinkle eaten by man and wife together do cause love between them." In Italy this plant is called Fiore di Morte, from the practice of making garlands of it in sorceries and incantations, hence the French still call it Violette does Sorciers.—*Eng. Cyc.*

(8572) VINCA MINOR, Lesser Periwinkle, has procumbent stems; the flowering stems usually erect. It is a native of Europe, in the same situations as the last, and is often found in Great Britain.

(8573) VINCA PUSILLA. *Syn.* V. parviflora. Roxb. Fl. Ind. ii. p. 1. Common in the East Indies. A small erect annual, stem smooth. Applied in India as an external stimulant in lumbago. *Royle.—O'Shaughnessy, p.* 448.

(8574) VINEGAR.

Khull, Arab.
Tsoo, Chin.
Kadidia, Cyng.
Azyn, Dut.
Vinaigre, Fr.
Essig, Ger.
Sirka, Guz. Hind.
Aceto, It.
Acetum, Lat.
Chooka, Mal.
Sirka Pers.
Vinagre Port.
Ukzus, Rus.
Vinagre, Sp.
Ganchica Sans.
Kadi, Tam.
Polla necloo, Tel.

Is an impure Acetic Acid, of which several varieties are known in commerce, such as, wine, malt, sugar, toddy &c., vinegar. It is extensively employed for pickling, in domestic cookery &c.—*Faulkner*. Acetic Acid is the volatile principle to the presence of which, diluted with variable proportions of water, vinegar owes its aroma and pungency. This acid exists, ready formed, in notable quantity in certain plants, as Sambucus niger or black elder Phænix dactylifera or Date tree, and Rhus typhenus. It may be readily generated by the fermentation of various vegetable and animal substances, especially the former. For commercial purposes it is made from certain vegetable and spirituous infusions, as those of the grape, malt, and the sugar cane; but any vegetable infusion capable of yielding alcohol will also, when exposed to the necessary conditions furnish vinegar. In most cases, and indeed whenever vinegar is manufactured on a large scale, and the vinous or alcoholic fermentation precedes the acetous the vinegar is formed entirely at the expense of the alcohol. But the conversion of alcohol into acetic acid it is said, ought not to be regarded as essential to acetification, since some vegetable and animal infusions become sour, from the formation of acetic acid, without any previous generation of alcohol. Acetic acid may be formed directly from the vapour of crude alcohol or spirits of wine in communication with the atmosphere, through either an ignited platinum wire, or by means of the black powder obtained by boiling protochlorine of platinum and potash with the alcohol. In Germany where the price of alcohol is very low, vinegar has been manufactured on a large scale on this principle. The process is thus described by Dr. Ure. Under a large case, which for experimental purposes may be made of glass, several saucer-shaped dishes of pottery or wood are to be placed in rows upon shelves over each other, a few inches apart. A portion of the black platina powder, moistened, being suspended over each dish, let as much vinous spirits be put into them as the oxygen of the included air shall be adequate to acidify. This quantity may be inferred from the fact that 1000 cubic inches of air can oxygenate 110 grains of absolute alcohol, converting them into 122 grains of absolute acetic acid, and sixty four grains and a half of water. The above simple apparatus is to be set in a light place (in sunshine if convenient), at a temperature of from 68° to 86° Fahr, and the evaporation of the alcohol is to be promoted by hanging several leaves of porous paper in the case, with the bottom edges dipped in the spirit. In the course of a few minutes a most interesting phenomenon will be perceived. The mutual action of the platina and the alcohol will be displayed by an increase of temperature and a generation of acid vapours which condensing on the sides of the glass case, trickle in streams to the bottom. This striking transformation continues till all the oxygen of the air be consumed. If we wish then to renew the process we must open the case for a little and replenish it with air. With a box of twelve cubic feet in capacity and with a provision of seven or eight ounces of platina powder, we can in the course of a day convert one pint of alcohol into pure acetic acid, fit for every purpose culinary or chemical with from twenty to thirty of the platina powder, which does not waste, we may transform daily nearly 300 pounds of bad spirits into the finest vinegar. Though English revenue laws preclude the adoption of this elegant process upon the manufacturing scale in that country it may be regarded as one of the greatest triumphs of chemistry where art has rivalled nature in one of her most mysterious operations. It is therefore evident that much of the success of any process adopted for the manufacture of vinegar will depend upon the manner in which the mother liquor is exposed to the atmosphere, that is upon the constant renewal of the air and the extent of surface exposed to its action the conversion of alcohol into acetic acid taking place only on the surface of the liquid. The knowledge of the fact that atmospheric air is indispensable to acetification explains why wine and beer which when inclosed in air-tight vessels undergo no change as soon as they are exposed to the air rapidly pass into the acetous fermentation. A second necessary condition is the presence of a substance capable of exciting fermentation, that is a ferment. In vegetable infusions as those of the grape and malt, the nitrogenised principles contained in them chiefly gluten, act as the ferment. Vinegar itself, vinegar yeast, lees beer yeast, leavened bread, and many other similar matters all of which contain gluten are capable of exciting fermentation and so promoting the generation of acetic acid. Experience has shown that the best ferment for inducing the transformation of alcohol into acetic acid is a portion of ready-made vinegar itself. A third condition which though not like the former essential yet greatly hastens the conversion is an increased temperature varying considerably in different cases but sometimes reaching as high as 100 Fahr. When any spirtuous liquor is exposed under the conditions requisite for acetification the following phenomena are observed to occur in succession. However clear the liquid may have been at first it quickly becomes turbid, currents or movements are soon visible in it, it is said in common language to be on the work. Slimy particles collect on the surface gradually forming a scum and which after a time falls as a sediment to the bottom. The Germans call this scum, vinegar mother, since it is capable of exciting acetification in fresh portions of liquid. During the process the temperature of the liquid rises and the peculiar aroma of vinegar becomes diffused in the surrounding air. As soon as all the alcohol has become converted into acetic acid the temperature falls to that of the atmosphere, the motion ceases, the liquid becomes clear and bright and its conversion into vinegar is complete. The four principal kinds of vinegar met with in commerce are wine vinegar, malt vinegar, sugar vinegar, and wood vinegar. The first three of these depend upon fermentation and result from the change of alcohol into acetic acid, while wood vinegar is obtained without the intervention of fermentation by the destructive distillation of wood. The principal adulterations of vinegar are, Dilution with water, the addition of sulphuric acid, the substitution of pyroligneous for acetic acid, the use of burnt sugar as a colouring agent, and occasionally the addition of acrid substances as chillies and grains of Paradise. The presence of sulphuric acid in British vinegar is not in itself to be regarded as an adulteration, since the addition of one part to a thousand is permitted by law. It is only when the quantity present exceeds this that it is to be considered as constituting an injurious and illegal adulteration. Dr. Hassall found,

1st. That the amount of acetic acid, the most important constituent of vinegar, varies greatly in different samples, the highest per-centage being 5.10 and the lowest 2.29 or less than half the first amount.

2nd. That since the standard No. 24 vinegars submitted to analysis range for the most part considerably over four per cent, vinegar to be deemed good ought to contain certainly not less than four per cent of real acid.—*Food and it adulterations, p.* 368.

(8575) *Acetum,* L. Acetum Gallicum, E. Acetum Vini, D. Vinegar, L. French or Wine Vinegar. E. D Though the L. C. does not distinguish Foreign from British Vinegar, yet as by their tests thay required only pure Vinegar to be used, it may treated of with the Foreign Vinegar.

L. Yellowish; of a peculiar odour; f ℥ 1 saturates *Carbonate of Soda* gr. lx. and *Sol. Chloride of Barium* produces in this quantity not above 1·14 gr. of Sulph. of Baryta. Its colour is not altered by Sulphuretted Hydrogen. the Sulphate of Baryta is equivalent to the quantity of Sul. (1 part in 1000) which is allowed by the excise laws to be added. The Sulph. Hydrogen will indicate the presence of Lead. The colour and odour are indications of purity, and the Soda will prove its strength. Wine Vinegar, according to the E. P., has a Sp. Gr. of 1.014 to 1.022 Ammonia in slight excess causes a purplish muddiness, and slowly a purplish precipitate. In f ℥ iv. complete precipitation takes place of all the Sulphuric acid present with *Sol. of Nitrate of Baryta* ♏ xxx. E.

(8576) *Acetum Brittanicum,* E. British Vinegar. British Vinegars are usually much paler, but sometimes much darker, from the presence of extractive and other matters, than the White Wine Vinegar, and are deficient in aroma. They often contain a much larger than the recognised proportion of Sulphuric acid, besides some Lime. The E. P. gives as tests of its being sufficiently pure, that it has a Sp. Gr. of 1·006 to 1·0019. Sulphuretted Hydrogen does not colour it; complete precipitation takes place in f ℥ iv. with *Sol. of Nitrate of Baryta* ♏ xxx.

(8577) *Acetum Distillatum,* L. E. D. Distilled Vinegar. *Prep.* Take of *Vinegar* (French by preference, E.) Cj. (10 parts, D.), distil in a glass retort, from a sand-bath, and into a glass receiver, Ovij. (Dilute the product if necessary with *Aq. dist.* till the Sp. Gr. is 1·005, E. Reject the first tenth, and preserve the next seven-tenths, of which the Sp. Gr. is 1·005. D. By distillation, the Colouring Matter, Sulphuric acid and other impurities, being left behind, the Vinegar becomes a colourless diluted Acetic Acid, and used to be called Acetous Acid. With the acid and water rises a little of the Mucilage, and also the Ethero-Spirituous substance (or Acetic Ether ?), which characterizes all good Vinegar, and is the source of its peculiar aroma, that is, if the first part has not been unnecessarily rejected. The odour and taste of the distilled are less agreeable than that of good Vinegar.

L. " It should be entirely dissipated by heat. Nothing should be precipitated from it on the addition of Acetate of Lead, or Nitrate of Silver, or Iodide of Potassium (showing the absence of Sul and H Cl, as well as of Lead). Neither

Sulphuretted Hydrogen nor Ammonia alter its colour (showing absence both of Lead and of Copper). Silver being digested with it, nothing is precipitated on the addition of H Cl (showing absence of Nit'). 100 grs saturate Carb. of Soda grs. xiij (100 minims saturate grs. viij. Sp Gr. 1·005, E.) The Sp. Gr. of the L. distilled Vinegar is 1·007 or upwards, according to Dr. Christison. The E. C. order dilution because distilled Vinegar is often above 1·005. Vinegar of India is made from the sediment of Toddy, and is coloured artificially. The juice of the *Gomuti palm,Arenga saccharifera,* put into a jar for five days, is converted into excellent vinegar, equal in strength to that produced by the vinous fermentation of Europe. Large quantities of the palmyra toddy is converted into vinegar, in Ceylon, and used for pickling gherkins, limes, the undeveloped leaves of the Cocoa-nut and palmyra trees, and other substances.—*Royle.*

(8578) VIOLA, a genus of Plants, the type of the natural order *Violaceæ.* The sepals are unequal, 5, all more or less drawn out downwards into ear-like appendages, erect after flowering; petals 5, unequal, convolute in æstivation, with 3-nerved claws, the lower one drawn downwards into a hollow spur; stamens 5, approximate or coarctate, inserted on the top of the teeth or a pentagonal 5-toothed torus; the filaments dilated at the base, oblong or triangular, bearing the anthers low down; lobes of anthers spreading at the base; the two anterior stamens bearing on their back two nectariferous lancet shaped round or linear appendages, which are drawn within the spur. The species of this genus are exceedingly numerous.—*Eng. Cyc.* Dr. Wight gives Viola odorata, 943; Wightiana, 943; (P.) glaucesens, 1825.

(8579) VIOLACEÆ, *Violet-Worts,* a natural order of Exogenous Plants. It has the following essential characters:—Sepals 5, persistent, with an imbricate æstivation, usually elongated at the base. Petals 5, hypogynous, equal or unequal, usually withering, and with an obiquely convolute æstivation. Stamens 5, alternate, with the petals occasionally opposite them, nserted on a hypogynous disc, often unequal; anthers bilocular, bursting inwards, either separate or cohering, and lying close upon the ovary; ilaments dilated, elongated beyond the anthers; wo in the irregular flowers, generally furnished with an appendage or gland at their base. Ovary -celled, many-seeded, or rarely 1-seeded, with parietal placentæ opposite the three outer epals; style single, usually declinate, with an oblique hooded stigma. Capsule of 3 valves, bearing the placentæ in their axis. Seeds often with a tumour at their base; embryo straight rect in the axis of fleshy albumen. (Lindley.) The species are herbs, undershrubs, or shrubs with alternate rarely opposite leaves, simple, usually involute before expansion, and all furnished with stipules. The flowers are erect or drooping, axillary, seated on peduncles, which are 1-flowered, solitary, or numerous, sometimes branched.

Violaceæ are related to *Polygalaceæ, Dorseraceæ,* and *Passifloraceæ.* The order is divided into two tribes, *Violeæ* and *Alsodineæ.* The former chiefly inhabit Europe and America; the latter, with the exception of the genus *Pentaloba,* are natives of South America and Africa. This order embraces 11 genera and 100 species.

All the *Violaceæ* possess in a greater or less degree emetic properties, which reside principally in their roots; the principal on which this property seems to depend has been separated by Boullay from some species of *Viola,* and has been called Violina. *Viola odorata* is admitted into the Edinburgh and Dublin Pharmacopœias for the purpose of making a syrup of the flowers.

(8580) VIOLA ODORATA. Banophsa. The plant in the dry state is sold in the bazars, and is prescribed in infusion by the Hakims as a diaphoretic in the treatment of fever. It nauseates slightly, owing to its containing a very minute quantity of the principle termed *violina,* closely resembling the emetine, on which depend the virtues of the ipechacuana of Brazil. The Viola odorata, as sold in the bazar, has dry, thready, fibrous roots, a pale yellow colour, knotty, some as thick as a quill. The leaves are heart-shaped; flowers blue. The entire plant retains slightly the delightfully sweet smell characteristic of this tribe. Under the name of Beg-banopsha, or violet root, and having precisely the smell of the fresh flower of our article, is sold in the bazar the well known "orris root" or Iris florentiana. Excellent issue peas are made from this root. To obtain violina the alcoholic extract of the plant is treated with ether to dissolve some fatty and green colouring matter. The residue is boiled in water, acidulated with sulphuric acid, and the solution is precipitated by hydrated oxide of lead. The precipitate contains *violina* and oxide of lead. The mixture boiled with alcohol, and the solution evaporated, yields the violina as a pale yellow matter, which may be rendered white by washing with cold strong alcohol. The root of this violet separated from the plant and reduced to powder, proves emetic in doses of from two to four drachms made into a decoction by boiling water. The emetic operation is preceded by much nausea, and is often followed by purging. Dr. O'Shaughnessy's experience on the whole leads him to prefer as an emetic the *Crinum toxicarium,* previously described. The infusion of one drachm of the root in half a pint of water, is a very good nauseant and diaphoretic. He did not succeed in his attempt to substitute the violet root or ipecacuanha in the preparation of Dover's powder, or of Twining's antidysenteric pills. Several species of violet possess similar properties. Royle has figured three Himalayan species, V. serpens, V. reniformis, and V. kunawurensis, the first of which is found in Mussooree, the second on the Choor mountain, the last in Kunawur.—*O'Shaughnessy, page* 208. Sweet scented violet requires a good rich soil, shelter from the sun and plenty of water, succeeds at Madras and flowers freely. Plants to be had on the Neilghery Hills. —*Jaffrey. Viole Odorata*, becomes quite acclimated in the Deccan, they are best grown in pots, and require to be moderately shaded, the morning sun being sufficient for them: the plants must be protected from the hot winds, and divided out into small bunches when transplanted. The white violet is not known in the Southern part of India, but in England the finest are generally found in calcareous soils; in India the violet seldom blossoms if grown in garden beds.—*Riddell. Viola Odorata*, Common Sweet Violet, has no stem; a hooked naked stigma; crenated smoothish roundish-cordate leaves; ovate obtuse sepals, the two lateral petals with a hairy line; the spur very blunt; the capsules turgid, hairy; seeds turbinate, whitish; the stoles creeping, long, rooting. This plant is a native throughout the whole of Europe, and in Siberia and China. It is common in England, but is a rare plant in Scotland and Ireland. Wherever this plant grows its delicious scent has made it a great favourite.—*Eng. Cyc.*

(8581) *V. Hirta*, the Hairy Violet.

(8582) *V. Canina*, Dog's Violet.

(8583) *V. Palustris*, the Marsh Violet.

(8584) *V. Lactea*, Cream-Coloured Violet.

(8585) *V. Tricolor*, Three-Coloured Violet, Heart's-Ease, or Pansy.

(8586) *V. Lutea*, Yellow Mountain Violet, or Yellow Pansy.

In the following table the distribution of 75 species, according to the form of their nectaries, is exhibited:—

				America :			
Nectaries.	Europe.	Asia.	Africa.	North.	South,	Australia.	Total.
Lancet Shaped.	19	4	1	22	1	1	48
Rotund . . .	2	0	0	1	0	1	4
Linear. . . .	12	4	1	6	0	0	23

(8587) VIOLA TRICOLOR, HEARTSEASE or PANSY. The flowers of this species of violet vary much in size, some only are odorous. The colours are, as its name indicates, mixed and numerous, being from deep purple and yellow, to blue and white, crimson, &c. They are not so common in India as the Viola Odorata, although easily raised from seed which is chiefly procured from Europe.

Propagation.—By seeds and cuttings. In Europe this flower has been brought to great perfection from the mode of continual offsets. The flowers are not generally scented, but some are found so on the Neilgherry Hills. The seed should be taken as soon as the seed vessels appear round and full; they may be dried in the house and the seed preserved; if left on the plant the capsules dry and open of themselves, fresh plants springing up from the seed that drops out. Requires a light loamy vegetable soil.—*Riddell.*

(8588) VIPENIE, the Tamil name of a Ceylon tree which grows to fourteen inches in diameter, and from twelve to fifteen feet high. It is used for boat-work and house furniture. —*Edye. Ceylon.*

(8589) VIREY, the Tamil name of a Ceylon tree which grows to about twenty inches in diameter, and twelve feet high. This is very handsome, hard wood. It produces a kind of seed which is very mealy, and which the poorer classes of the natives eat as a substitute for rice. —*Edye. Ceylon.*

(8590) VIROLA SEBIFERA, a large tree of Guyana, which belongs properly to the genus *Myristica*, and is in fact by some called Nutmeg of Cayenne, and has the same properties as many of the other species of that genus. When incisions are made into the bark, a reddish glutinous juice exudes, which, when fresh, is used as a caustic, and which concentrates in time. The mace is of a red colour, and within it the kernel is of a whitish colour, which, when powdered and put into boiling water, yields a yellowish-coloured fatty substance which swims on the surface; it is caustic in taste, and has a slight odour of nutmeg. In the country candles are made of it; hence Europeans call the tree Porte Suif.—*Eng. Cyc.*

(8591) VISCUM, a genus of Parasitical Plants belonging to the natural order *Loranthaceæ*, of which one species is found wild in England. *V. album*, the Mistletoe, is in many respects a production of great interest to the physiologist. The seeds in germination seem to offer an exception to a general law, that the radicle of the embryo shoots downwards, and the plumule upwards; for it is found that the radicle of the Mistletoe invariably turns itself down upon the body to which it is attached, whatever may be the position of the surface of that body with respect to the earth. For instance, if a cannon ball, to which mistletoe-seeds are glued on all sides, be suspended by a cord some distance from the earth, both the upper and under seeds, as well as those at the sides, all direct their radicle to the surface of the ball. This property ensures their growing upon the branches of trees, to whatever side they may happen to stick. In fixing itself upon a branch, the embryo of the Mistletoe curves its radicle down upon the bark, and then adheres firmly to it, and it is a twelvemonth before the plumule begins to extend; this may be to give the radicle time to pierce the bark and introduce itself below the liber, where it expands and acts the part of a root by attracting thence the fluids which are necessary for the support of the parasite. It is not a little remarkable that in the structure of its ovary this plant, and others of its order, should offer the singular fact of the ovule not existing at the time of impregnation, nor appearing till from six weeks to two months later. The fruit, which is covered with a viscid pulp, is made by the Italians, and even in Herefordshire, into a kind of birdlime; and as it is a favourite food of the large or Missel Thrush, it is thought to have given rise to the proverb, 'Turdus malum sibi cacat.' The plant is not of any known use to man, and is of popular interest chiefly as having been connected with Druidical superstitions. The Mistletoe of the Druids was exclusively that found upon the oak, and was possibly so much valued because of its rarity; for its appearance on that tree is now so rare, that many persons have believed the Mistletoe of the Druids either to have been some other plant or to have had no real existence. Dr Wight gives Viscum B coralloides, 1019; moniliforme, 1018; orbiculatum, 1016; ramosissimum, 1017.

(8592) VISCUM MONOICUM. No medicinal properties of any importance had been observed in the natural order of plants the Loranthaceæ until it was accidentally discovered in 1836, that the Viscum found on the nux vomica trees of Cuttack possessed all the properties of the supporting tree. As the occurrence attracted attention, and was of considerable interest in botanical physiology, the particulars in detail are as follows; In 1837, Lieut. Kittoe, then with his regiment at Cuttack, received information of the existence of a parasite on the nux vomica trees, to which extraordinary medicinal powers were attributed by the natives. They called it *Kuchila ke mulung*, held it to be an extremely powerful *narcotic*, and poisonous in small doses, and they used it in the treatment of agues and rheumatism. Mr. Kittoe having procured specimens of the leaves sent them to Dr. O'Shaughnessy, for experiment. Given in three grain doses to dogs and kids, tetanic spasms set in, in the course of from five minutes to a quarter of an hour, recurring at intervals, and proving fatal by fixing the diaphragm, and causing asphyxia.—*O'Sh. p.* 375.

(8593) VISENIA UMBELLATA. A considerable tree of great beauty, with rose coloured flowers and velvetty leaves; introduced from Sumatra, the seeds having been sent to the Horticultural Society's Garden, by Dr. Wallich.—*M. E. J. R.*

(8594) VITEX, a genus of Plants belonging to the natural order *Verbenaceæ.* It has a short campanulate 5-toothed calyx. The corolla is irregular, somewhat labiate, divided into 5 lobes. Stamens 4, didynamous, inserted into the corolla. Ovary superior, roundish; style the length of the stamens; 2-pointed and diverging stigmas The fruit is a globular berry, a little hard, with its base covered by the calyx, and divided into four single-seeded cells.—*Eng. Cyc.* Dr. Wight gives Vitex altissima, 1466; *arborea*, 1465; leucoxylon, 1467; negundo, 516; pubescens, 1465.

(8595) VITEX AGNUS CASTUS. The seeds are inodorous when entire, but when bruised their odour is acrid and disagreeable. The taste acrid and pepperish, very persistent. They are very rich in essential oil, and possess powerful stimulating properties. At Smyrna the powder strewed over sliced onion and applied to the stomach is deemed a certain remedy in colic (*Lindtey*) —*O'Shaughnessy. page.* 485. In the month of February, in the tropical region below Darjeling the air is scented with the white blossoms of the *Vitex agnus castus*, which grows in profusion by the road-side.—*Hooker, Him. Jour page.* 374. *Vitex Agnus-Castus* is the longest-known species, and a native of the south of Europe, has digitate leaves of 5 or 7 nearly entire leaflets, something resembling those of the hemp-plants, and it forms a shrub of about 12 feet in height. The flowers are arranged in spiked whorls, and have an agreeable fragrance. The fruit is globular, rather smaller than black pepper, with an acrid and aromatic taste, whence it is called Petit Poivre Sauvage in the south of France. It was well known to the ancients, and forms the *Piper agrestis* of some authors. In India the fruits of the species *V. triphylla* and *V. Negundo*, which are indigenous there, have the same properties ascribed to them, and are called Filfil Burree (Wild Pepper). The ancients considered the *Vitex* anti aphrodisiac, but the berries, from their warm aromatic taste, must be possessed rather of stimulant properties.

(8596) VITEX ALATA. A small tree found in the Naggary Hills, leaves ternate, petioles winged.—*M. E. J. R.*

(8597) VITEX ALTISSIMA. Magelloo.
Kat miella, Tamil.

A large tree of great beauty, when in flower, frequent on the slopes of the Western Ghauts, reported to be fit for cabinet purposes.—*M. E. J. R. of* 1855. It is thus described by Dr. Wight. "This is a large tree frequent on "the lower slopes of the ghaut mountains, but "I am not acquainted with the timber except in "so far as can be learned from a small outside "specimen which seems close grained. It is re-"ported fit for cabinet purposes." It would be desirable to learn more of this tree. A specimen formerly grew in Dr. Anderson's garden near the College bridge in Madras. Roxburgh describes the wood of one of its congeners V. arborea, common in the Northern Circars, as of a chocolate color, when old, exceedingly hard and durable.—*M. E. J. R. of* 1857.

(8598) VITEX ARBOREA.
Boosi, Tel.

A native of the mountainous parts of the Circars, Chittagong &c. where it grows to be a very large tree, flowering time the hot season: the seed ripens during the rains. The wood of this tree when old is of a chocolate colour exceedingly hard and durable which renders it useful for various purposes (Roxb.)—*Rohde M S.S.* This species of vitex is very common at Maulmain, and produces a valuable small timber. Roxburgh says: " Wood when old, chocolate coloured, very hard, and durable."

(8599) VITEX LEUCOXYLON.

Karril, RHEED.

A native of Ceylon, Coromandel and the mountains of Chittagong, flowering time April.—*Rhode, M. S. S.*

(8600) VITEX NEGUNDO.

Noochie, TAM.
Nergundi, BENG.
Shumbali DUK.
Fenjengisht, ARAB.
Nisinda, HIND.
Wayalakoo, TEL.
Sinduya. and
Sindhooka. SANS.

In India a decoction of the aromatic leaves is used as the warm bath for women after delivery. (*Roxb.*) In medicinal qualities it is similar to, but weaker than V. Agnus castus. The decoction of the root is a pleasant bitter and is given in cases of intermittent fever. The warm leaves are stated by Mr. Sherwood to be a useful application in rheumatism or sprains. The Mahomedans are in the habit of smoking the dried leaves in cases of head-ache and catarrh. Fruit considered vermifuge in Behar.—*O'Shaughnessy, page* 435.

(8601) VITEX, *Species.* A tree of considerable size, a native of the forests in the intetior parts of Coromandel.—*Rohde, M. S. S.*

(8602) VITEX TRIFOLIA. Roxb. Fl. Ind. iii. p. 69.

Neer nochie, TAM.
Panee ke shumbalie, DUK.
Ussel ke abee. ARAB.
Nisindha also Seduaree, HIND.
Neela vavilie, TEL.
Caranosi, RHEEDE.
Jala nergundi and Sinduvara, SANS.
Neergoonda, DUK.

Young shoots round and villous. Leaves slightly bitter, but of delightfully aromatic taste and smell; are deemed powerful external applications in rheumatism, sprains, &c. The powdered leaves are said to cure intermittent fevers. The fruit in powder is given usually in electuary, or decoction, for amenorrhæa and several other diseases. It is a common Indian plant. Sir William Jones in the 4th vol. Asiatic Researches, p. 293, states that the leaves are used to stuff pillows, to cure catarrh and headache. The flowers, according to Dr. Hamilton, are prescribed in Behar with honey in fevers attended with vomiting and much thirst (*Ainslie*, ii. p. 238.)—*O'Shaughnessy, page* 484. This in the Deckhan is a common shrub with pretty blue flowers, generally to be met with growing in patches, in moist places appearing in April and May, but more or less throughout the year. *Riddell* The chaste tree, is a shrub much cultivated by the Burmans, it bears a handsome little blue flower. Both leaves and flowers are "rather agreeably heavy scented."—*Mason.*

(8603) VITIS, a genus of Plants, the type of the natural order *Vitaceæ.* It possesses the following characters:—Calyx usually 5-toothed; petals 5, cohering at the top, resembling a calyptra, separating at the base and deciduous; 5 stamens; style none; berry 2-celled, 4-seeded; cells and seeds often abortive. The species are climbing shrubs, with simple lobed, cut or toothed, rarely compound leaves, the thyrsoid racemes of small greenish-yellow flowers. They are found principally in Asia and America. The best known of the species of *Vitis*, and perhaps one of the most extensively cultivated and useful of plants, is the *V. vinifera*, the Common Vine or grape-Vine. It is characterised among the other species by possessing lobed, sinuately-tooth, naked or downy leaves. A multitude of varieties of this plant have been recorded, both occurring wild and resulting from its very extensive cultivation.

Like most extensively cultivated plants, it is very difficult to ascertain of what country the vine is originally a native. It is among the plants of which we have the earliest records in the books of Moses, and from which it appears to have been made use of in the same manner as at the present day. Although the vine is found in many places wild, it may still be doubted whether it is indigenous there, on account of its frequent cultivation. There can be little doubt of its being truly indigenous in the East, in the district between the Black and Caspian seas. In the forests of Mingrelia and Imiretia it flourishes in all its magnificence, climbing to the tops of the highest trees, and bearing bunches of fruit of delicious flavour. In these districts no cultivation of the vine exists, and the inhabitants seldom harvest the abundance of fruit that is produced. In many spots in France, Germany, Portugal, and Italy, the vine is found wild, but the fruit is very generally of an inferior kind, and it may be doubted whether it is truly indigenous in any parts of Europe.

The cultivation of the vine extends from near 55° N. lat. to the equator, but in south latitudes it only extends as far south as 40°. It is cultivated at various elevations. In middle Germany it ceases from about 1000 to 1500 feet above the level of the sea. On the south side of the Alps it reaches 2000 feet; in the Apennines and Sicily 5000 feet; and on the Himalayas as high as 10,000 feet above the level of the sea. The point of the greatest importance in the ripening of the fruit of the vine is the length of the summer. Thus, although the maximum of summer heat is as great at Moscow as in Paris, yet the vine will not ripen its fruit in the former place, and this arises from the fact that although the greatest heat of the months of June and July are as great as that of Paris, the months of August and September are several degrees below. Nor will the mean temperature serve as a rule to indicate where the vine may be cultivated. England has a mean temperature as high as many parts of the world, where the vine flourishes in the greatest perfection; but it will be found that although England is warmer than these countries in the winter, it is not so warm in the months of September and October, at which time the vine is ripening its fruit.

The fruit of the vine is used as an article of diet in several ways. Its agreeable sweet acid flavour when ripe has always rendered it a very desirable food when fresh. The ancients also, there can be little doubt, were in the habit of drinking the expressed juice of the grape before fermentation. Grapes are also dried and used under the name of raisins. The drying is generally effected by cutting half through the fruit-stalk whilst they are suspended on the tree. Grapes thus dried are called Muscatel raisins, and are principally brought from Spain and the Levant. There is another dried grape used much in England, called currants, or Corinths, but which are very different things from the common currant of our gardens, and are the produce of a vine which grows in Zante and Cephalonia. Dr. Wight gives Vitis adnata, 144; angustifolia, 176; auriculata, 145; carnosa, 171; lanceolaria, 28; lanceolaria, 177; muricata, 740; Neilgherrensis, 965; pallida, 50; quadrangularis, 51; setosa, 170.

(8604) VITIS CARNOSA, Wall. *Syn.* Cissus carnosa, R.

Kusar. Hind. | Kanapa tiga. Tel.

Remarkably acrid, roots used in native medicine; it is common in hedges and forests in Bengal, and it flowers in the rainy season. The Cissus setosa is in all its parts excessively acrid, and Roxburgh states that the leaves toasted and oiled are applied to indolent tumors to bring them to suppuration. The young tender and succulent stems of Vitis (Cissus) quadrangularis are very generally eaten in India. When old this plant is deemed acrid, and a useful medicine; in arabia it is used as an external application in rheumatic pains of the back and loins. The Cissus arborea of Forskahl is the Salvadora persica of modern writers, and possesses some remarkable and valuable properties—see art. *Salvadora.—O'Shaughnessy, page* 245.

(8605) VITIS INDICA (Andhouka, Duk.) produces beautiful clusters of round purple berries and a large grape which is very fair eating; it is not the common vine of Europe, which nevertheless is probably this Himalayan plant, the *Vitis Indica.*

The origin of the common grape being unknown, it becomes a curious question to decide whether the Himalayan *Vitis Indica* is the wild state of that plant: a hypothesis strengthened by the fact of Bacchus &c., having come from the East.—*Hooker, Him. Jour. Vol.* II. *p.* 187. A wild shrubby climbing plant, common throughout the Deccan.—*Riddell.*

There are three or four species of grapes in the Tenasserim Provinces. This one is seen creeping over every hedge and bush, which has sometimes been mistaken by Europeans for the true grape vine, but the fruit is acrid, like all the indigenous species, and not edible even to a native.—*Mason.*

(8606) VITIS QUADRANGULARIS.

Perrunday, Tam.

This trailing, and creeping plant with 4 angled and winged stems is used by the Natives as greens, and in the preparation of chatney; cultivated about villages.—*Jaffrey.*

(8607) VITIS VINIFERA. Lin. The wine grape.

Booangoor, Malay.
Ungoor, Persian and Duk.
Draksha, Sans.
Dakh. Hind.
Inub. Arab.
Kodimoondrie pullum, also Dividatsi, Tam.
Dracha pundoo. Tel.

A native of the south of Asia Minor, now universally cultivated. The common Grape fruit is cultivated in the greatest perfection in all parts of the Deccan, and the finest flavored are found in the gardens in the neighbourhood of Dowlatabad, about seven miles N. W. of Aurungabad. The mode of culture is as follows:—the trees are reared from slips taken at the time of first cutting after the rains, and when ready to be removed are put about seven or eight feet apart. They are for the first twelve months trained on dry sticks; after that, a large straight branch of the pangrah, with a fork left at the top to support the vine, is placed about twelve inches from it; if put at a greater distance it is apt to give a bend to the vine which is hurtful. The vine cannot be too straight, and the length of the prop should be about five feet. —*Riddell.*

(8608) *Raisins, Uvæ passæ,* are Grapes in their dried state and well known, being prepared by being dried in the sun or in ovens, or by steeping them in a weak alkaline ley formed from the ashes of the burnt tendrils. Some are prepared by partially cutting the stalk of the bunches before the grapes are quite ripe, and allowing them to dry upon the vine. They are chiefly prepared in Spain and in the Levant, hence called Valentias and Smyrnas; also in Affghanistan, whence they are taken to India. The best are the Muscatels, from the grape of that name. The Sultanas, like the *Bedanas* of the East, are without stones. The Malaga Raisins are large and fleshy, of a purplish-brown colour. Those of Calabria are similar. The Smyrrna Raisins are of a yellowish-brown colour, slight musky odour, less sweet and agreeable than the former.

Raisins differ from Grapes in containing less water and acid, and more Sugar. The Lees of the Wine, yield Tartar, that is impure Cream of Tartar. As the Saccharine matter disappears and becomes converted into Alcohol, this salt, being insoluble in the Spirit formed, is deposited in the casks, and is well known by the name of *argol* or *tartar*. This is chiefly composed of Bitartrate of Potash with a little Bitartrate of Lime. Besides its own particular uses (*v.* p. 86), it is important as the salt from which Tartaric acid is obtained.

Must is the expressed juice of the ripe grape. It readily undergoes fermentation. Fermented Must gives two products, *wine* and *vinegar.*

Wine. Wine is a white, rosy or red liquid, according to the kind of grape used, and the process followed. It is fluid, limpid, and more or less alcoholic, &c. Sugar is present in some kinds. The smell and taste vary indefinitely. The wines chiefly employed in Hospital practice are two—port (Oporto) and sherry, (Xeres)

Port is red, approaching to crimson, slightly astringent. The extract consists of tannic and gallic acid, sugar and colouring matter. By distillation port wine of best quality yields of alcohol 23 per 1000.

Port is very much employed in disease of debility, scurvy, typhus fevers, cholera, the last stages of dysentery, consumption, &c.

Sherry (Vin de Xeres) is light amber coloured, sweetish, 100 parts contain 18 of alcohol. There is no astringent matter, but traces exist of citric and malicacid. Sherry is employed as a stimulant but is apt to produce an aperient and even cathartic effect. Various fraudulent substitutions are daily used in the preparation of wines, to detect which M. Fee gives the following rules, which have been found to be correct.

The alcoholic solution of caustic potash changes	
Pure wine, ...	*Green.*
If coloured with mulberries, ...	*Violet.*
———— with logwood, ...	*Violet Red.*
———— with Brazil wood or beet root...	*Red.*
Acetate of lead precipitates	
Pure wine....	*Green.*
Wine adulterated with elder berries, logwood, or myrtle berries,...	*Deep blue.*
—— with red sandal wood, beet root, or Brazil wood, ...	*Red.*
Alum precipitates,	
Wine coloured with litmus,....	*Clear violet.*
———————— logwood,.	*Deep violet.*
———————— Brazil wood,...	*Red.*

Lead sometimes exists in wine, and is detected by adding carbonate of soda ; carbonate of lead is thrown down, which will be turned black by sulphuretted hydrogen gas. Alum, which is often present, is detected by the wine affording a precipitate with ammonia, carbonate of potash, and acetate of baryta.

The manufacture of wine is carried on, on a very simple plan. The ripe grapes are trodden, by men or cattle in a vat, and the juice which is thus forced out is called *Must.* The *Marc* or solid parts being mixed with the Must again in wooden tanks, fermentation soon takes place, much heat is developed, and carbonic acid gas is copiously disengaged ; the Marc now rises to the surface of the tank, and when the effervescence ceases, the subjacent wine is drawn off from below, and the Marc subjected to strong pressure.

If the wine be bottled before the fermentation has terminated, it has the property of foaming in the glass in consequence of the sudden liberation of carbonic acid ; champagne is thus manufactured. In the preparation of white wines the Marc is removed before fermentation.

According to Humboldt, the conditions of climate essential for the manufacture of good wine are, a range of temperature from 62 to 50° or even 47°, provided the winter heat is not lower than 38°, nor that of summer below 66° or rather 68°. At a higher mean temperature the juice passes too rapidly into the acid fermentation. The manufacture of wine thus becomes impracticable in the plains of India ; moreover the rains set in so soon after the ripening of the grape, that the manufacture of raisins by sun-drying is equally impossible. Mr. Royle informs us of the existence of luxuriant vineyards in Kunawur, bstween N. lat 31.° and 32° (or nearly that of Madeira) at an elevation of 9000 to 10,000 feet, the grape being of delicious flavour, and the climate exactly suited for both the wine and raisin manufacture. Grapes are also abundant in Cashmere, Cabul, and Bokhara, and afford both raisins and wine. The most celebrated of eastern wines however is the *Shiraz* perpared in the districts of Khol-lar, near the village of Bend Emir. There are two varieties, red and white, the former containing 15½, the latter nearly 20 per 100 of alcohol.

The different kinds of raisins called *Monuka, Kishmish* and *Bedana,* are, Mr. Royle states, brought chiefly from Istaulik.—*O'Shaughnessy, pages* 251-254.

(8609) VIVERRIDÆ, a family of Carnivorous Animals, embracing the genus *Viverra* of Linnæus. This author thus defines his genus *Viverra* :—Dentes primores vi : intermediis brevioribus. Molares plus quam tres. Lingua retrorsum, sæpe aculeata. Ungues exserti.

The species comprised under this genus, in the twelfth edition of the 'Systema Naturæ,' are *Viverra Ichneumon, V. nasua, V. narica, V. putorius, V. Zibetha,* and *V. Genetta.*

The *Viverrina,* Dr. J. E. Gray's third family of *Felidæ,* is the first of his second subdivision of that family, named, *Necrophaga.*

The *Viverrina* comprise the following genera ; —*Viverra, Proteles, Prionodon, Genetta, Galidia, Galictis, Herpestes, Mungoz, Atilax, Ichneu-*

nia, *Uva*, *Crossarchus*, *Ryzæna*, *Hemigale*, *Paradoxurus*, *Paguma*, *Arctictis*, *Cynogale*, *Cryptoprocta*, and *Bassaris*.

(8610) *Viverra* (Cuv.).—The deep pouch situated between the anus and the sexual organs, is divided into two bags filled with an abundant concretion of the consistence of pomade, exhaling a strong musky odour, secreted by glands which surround the pouch. Pupil of the eye round during the day. Claws only half retractile. Dental Formula :—

$$\text{Incisors}\,\frac{6}{6},\ \text{Canines}\,\frac{1-1}{1-1};\ \text{Molars}\,\frac{6-6}{4-4} = 36.$$

(8611) *Viverra Civetta.* THE CIVET. Length of the elongated body from two to three feet ; tail about half as long as the body. Height rom ten inches to a foot. Hair of the body long, brownish-gray, with numerous interrupted trans-erse black bands or spots of the same colour. The hairs on the ridge or middle line of the black rom between the shoulders are longer; and can be aised or depressed at the pleasure of the animal. Legs and most part of tail black ; upper lip and ides of the neck almost white. Eyes surround-d each by a black patch. Two or three black bands pass from the base of the ears obliquely owards the shoulder and neck, which last has a broad black patch. It is a native of the north f Africa. The Civet approaches in its habits earest to the Foxes and smaller Cats, preferring o make its predatory excursions against birds nd smaller quadrupeds in the night, although, ke these *Carnivora*, it will occasionally attack its rey in the day time. In a state of captivity it ecomes in a degree tame, but never familiar, nd is dangerous to handle. The young re fed on farinaceous food, millet-pap for nstance, with a little flesh or fish : and, hen old, on raw flesh. Many of them are kept n North Africa to obtain the perfume which ears the name of the animal, and brings a igh price. The civet is procured by scraping he inside of the pouch with an iron spatula at ntervals about twice a week. If the animal is n good condition and a male, especially if he as been irritated, a dram or thereabouts is ob-ained each time. The quantity collected from he female does not equal that secreted by the ale. Civet, like most other articles of this na-ure, is much adulterated, and it is rare to get quite pure. The adulteration is effected with uet or oil to make it heavier.

(8612) *Genetta*, Cuv.

(8613) *Viverra Rasse* is a species found Java. Dr. Horsfield says " it supplies Java the place which the *V. Civetta* holds in frica, and the *V. Zibetha* on the Asiatic con-nent from Arabia to Malabar, and in the large lands of the Indian Archipelago. I have en-eavoured to show that, by its form and marks, is essentially distinct from the *V. Zibetha* ; d it differs as much in its natural disposition as in external characters. The *V. Zibetha* is an animal comparatively of a mild disposition ; it is often found among the Arabs and Malaya who inhabit the maritime parts of Borneo, Macassar, and other islands, in a state of partial domestication ; and by the account of the natives, becomes reconciled to its confinement, and in habits and degree of tameness resembles the common domestic cat. The Rasse, on the contrary, preserves in confinement the natural ferocity of its disposition undiminished. As the perfume is greatly valued by the natives, it is frequently kept in cages ; but as far as I have observed, must always be obtained for this purpose from a wild state, never propagating in a state of confinement. "The Rasse is not unfrequently found in Java, in forests of a moderate elevation above the level of the ocean. Here it preys on small birds and animals of every description. It possesses the sanguinary appetite of animals of this family in a high degree, and the structure of its teeth corresponds strictly with the habits and modes of life. In confinement it will devour a mixed diet, and is fed on eggs, fish, flesh and rice. Salt is reported by the natives to be a poison to it. The odoriferous substance is collected periodically : the animal is placed in a narrow cage, in which the head and anterior extremities are confined ; the posterior parts are then easily secured, while the civet is removed by a simple spatula." The substance obtained from the Rasse agrees with the civet afforded by the *V. Civetta* and *V. Zibetha* in colour, consistence, and odour. It is a very favourite perfume among the Javanese, and applied both to their dresses and, by means of various unguents and mixtures of flowers, to their persons. Even the apartments and the furniture of the natives of rank are generally scented with it to such a degree as to be offensive to Europeans ; and at their feasts and public processions the air is widely filled with this odour. (' Zoological Researches.')

(8614) *Paradoxurus* (F. Cuv).—Has the character generally of the Civets and genets.

(8615) *Paradoxurus Typus*, the Paradoxure.

(8616) *Mangusta*, Olivier. [ICHNEUMON.]

(8617) *Mangusta Javanica*, has the ear bearing considerable resemblance to that of man. Pouch very extensive. Hair long on the body and tail, but short on the head and extremities, rigid and glossy. Length, including the tail, about 2½ feet. Rumphius gives a curious account of this species, which is the Garangan of the natives, who greatly admire its agility. It attacks and kills serpents with the greatest boldness ; and Rumphius speaks of its value in performing this service and its method of encountering those reptiles. The Javanese nobles, he says, pay a considerable price for it, that they may amuse themselves with the sport of these fights, when the two enemies are opposed to each other, the serpent endeavours to twine round the quadruped and kill it. The latter submits to this, but inflates itself to turgescence; and when the serpent enfolds it and advances its head to give the deadly bite, the Mangouste contracts his body, slips out of the folds, seizes the serpent by the neck and kills it. Dr. Horsfield states that the *Mangusta Javanica* is found most abundant in the large teak-forests and that it is very expert in burrowing in the ground in pursuit of rats. "It possesses," says our author in continuation, "great natural sagacity; and from the peculiarities of its character, it willingly seeks the protection of man. It is readily tamed, and in a domestic state it is docile and attached to its master, whom it follows like a dog; it is fond of caresses. and frequently places itself erect on its hind legs, regarding everything that passes with great attention. It is of a very restless disposition, and always carries its food to the most retired place in which it is kept to consume it. It is very cleanly in its habits. It is exclusively carnivorous, and very distructive to poultry, employing great artifice in the surprising of chickens. For this reason it is rarely found in a domestic state among the natives, as one of their principal articles of food is the common fowl, and great quantities are reared in all the villages. The Javanese also, like the Mohammedans in general have a great partiality for cats, and they are unwilling in most cases to be deprived of their society for the purpose of introducing the Garangan. It has also been observed that its sanguinary character shows itself occasionally in a manner that renders it dangerous in a family as a domestic animal, and it indulges at intervals in fits of excessive violence."

(8618) *Ryzæna*, Ill.

(8619) *Nasua*, Storr.

(8620) *Cercoleptes caudivolvus*, the Potto, or Kinkajou, is referred by some writers to *Ursidæ*, but by others to the *Viverridæ*. It has the following dental formula:—

$$\text{Incisors, } \frac{6}{6}\text{; Canines, } \frac{1-1}{1-1}\text{; Molars, } \frac{5-5}{5-5} = 36.$$

Eng. Cyc.

(8621) VIVERRICULA MALACCENSIS.

MALACCA CIVET.

SYN, Viverra malaccensis, Gmelin.
,, Rasse, Horsfield.
,, Gunda, Buchanan Hamilton MSS.
,, indica, Geoffroy.
,, bengalensis, Gray : Illustr.
,, pallida, Gray : Illustr.
Genetta manillensis, Eydoux.

The Indian civet-cats secrete an odoriferous substance identical with civet, though not the civet of commerce. This species is not infrequently found in the Tenasserim villages, and its secretion enters into the Burmese Materia Medica.—*Mason.*

Viverricula Malaccensis (V. indica Sykes) is a little civet like beast, with a sharp nose. It is the Gandogokul of the Bengalis.—*Blyth.*

(8622) VIVERRA ZIBETHA. ZIBETHCIVET.

SYN. Viverra Zibetha, Linne.
,, undulata, Gray.
,, melanurum, Hodgson.
,, orientalis, ,
,, civettoides. ,,

This is another species of civet-cat, not so abundant as the preceding, which the Burmese call "the horse-cat," from the mane on its neck.—*Mason.*

(8623) VOLKAMERIA FRAGANS. VERBENACEÆ.

Irun, HIND.

A large common shrub with ovate cordate dentate leaves; white fragrant flowers (in the cold weather) terminal panicles.—*Riddell.*

(8624) VOLKAMERIA INERMIS.

Shangam coopy, TAM.
Sangkoopee, HIND.
Nalla Opie, TEL.
Kundali, SANS.
Bunjonia, BENG.

A scandent ramous shrub, pure white flowers, blossom nearly throughout the year, hedges are made with it.—*Riddell.* The juice of the root and leaves is bitter, and given as an alternative in venereal, and scrofula. Dose a table spoonful, The plant is common in the jungles, and is very beautiful. Nine species are described by Roxburgh, but he gives no account of their supposed medicinal virtues.—*O'Shaughnessy, page* 486.

(8625) VOLUTIDÆ, a family of Gasteropodons *Mollusca*, whose shells are prized by collectors above most others for their beauty and rarity; and which, from their numbers and carnivorous habits, are powerful agents in keeping the *Mollusca* and *Conchifera* within due limits—*Eng. Cyc.*

(8626) VOLUTA ÆTHIOPICUS (Broderip) *Æthiopicus* has the shell obovate, ventricose, of an orange-cinnamon colour. the spire coronetted with thick-set shore, vaulted spines; pillar 4-plaited This shell is native of the African Ocean and the East Indian seas.

(8627) VOLUTA VESPERTILIO, has the shell turbinated, armed with strong distant acute tubercles, white, yellowish, or reddish, painted with angularly flexuous spots; spire muricated, the apex with small tubercles; lip with a sinus above; pillar 4-plaited. It is found in the Indian Seas, Amboyna, Moluccas, &c. The species of *Voluta* have been found at depths ranging from 7 to 14 fathoms. The species are very numerous and very beautiful.

(8628) *Mitra*, Mitre Shells, have the shell fusiform, thick; spire elevated, acute; aperture small, notched in front; columella obliquely plaited; operculum very small. The animal has a very long proboscis; it emits a purple liquid, having a nauseous odour, when irritated. The eyes are placed on the tentacles, or at their base. Three hundred and fifty recent species and ninety fossil have been described.

(8629) *Mitra episcopalis*, Bishop's Mitre Shell. The animal has a narrow foot, compressed and channelled, at its root, nearly square and slightly auriculated in front with a marginal furrow, and pointed behind. The head is very small, rounded, with two tentacles, which are scarcely a line and a half in length; the eyes sessile at their base. An enormous proboscis, which is sometimes double the length of the shell. The respiratory siphon does not project beyond the canal; it is marked with black at the point: the rest of the animal is yellowish, The proboscis is white.

Shell turreted, smooth, white, spotted with bright red; pillar four-plaited; outer lip denticulated at its lower part; epidermis thin. It is found in East Indian seas and islands of the South Sea, Tongataboo.

(8630) *M. adusta*, has the shell fusiform, turreted, albido-lutescent, ornamented with longitudinal rufous-brown spots; the striæ transverse, impressed, rather remote, and dotted; the sutures crenulate; the pillar five-plaited. It is found at Timor, Vanikoro. There are at least two varieties,

(8631) *M. corrugata.* The shell is ovate-fusiform, longitudinally plicated, transversely rugous, whitish; bands and belts brown; whorls angulated above; the last whorls with a submuricated angle; pillar four-plaited. It is found in the Indian Ocean and New Guinea.

(8632) *Imbricaria* and *Cylindra* are sub-genera of *Mitra.*

(8633) *Volvaria* has the shell cylindrical, convolute; spire minute; operture long and narrow; columella with 3 oblique plaits in front. The species, five in number, are all fossil.

(8634) *Marginella* has the shell smooth, bright; spire short or concealed; aperture truncated in front; columella plaited; outer lip (of adult) with a thickened margin. Animal similar to *Cypræa.*

(8635) *Oliva*, which is sometimes referred to *Buccinidæ*, has the following characters:—Animal involved, compressed, with a small head terminated by a proboscis; tentacles approximated, enlarged at their base and subulate at their extremity, carrying the eyes on small convexities about their middle part externally; foot very large, oblong, and slit transversely anteriorly; mantle with a single lateral lobe covering the shell in great part, with two tongue-like processes at the side of the branchial opening, and forming in front a very elongated siphon; a single branchial pectination; male organ very voluminous, on the anterior part of the right side. Opereulum horny, elongated, very small with a marginal apex.

(8636) *Oliva textilina* has the shell einereous white, subreticulated with flexuous dotted lines, with two brown bands inscribed as it were with characters; the callus of the canal prominent It is found in the Antilles and New Guinea.

(8637) *Oliva mansa* has the shell cylindrical, the apex retuse, black; lip subplicate externally: aperture white. It is found in the East Indian Ocean, Australia, and Amboyna.

(8638) *Oliva sanguinolenta*, has the shell cylindrical, very delicately reticulated, with rufous brown small lines, girt with two brown zones; the pillar orange-red. It is found in the East Indian Ocean and on the coast of Timor.

The species have been found at depths varying from the surface to twelve fathoms, on mud, sandy-mud, coarse sand, &c. The species are fond of flesh, but they only suck the juices; and at Mauritius they are taken with that bait in the following manner, according to Lieutenant Harford, who was for some time there, brought home some very fine Mauritian shells, and gave the information to Mr. Broderip. The fishery was carried on by means of a line made to run parallel with the bottom of the sea; to which line small nooses, each containing a piece of the arms of a cuttle-fish (*Sepia*), were appended so that the bait touched the bottom. To one end of the line a shot was attached by way of mooring; and over it were a buoy and a flag. The other end of the line swung with the tide, and that end was also marked by a buoy and a small flag. The sport was carried on in deep water over sand-banks, and the best times were the morning and the evening. The apparatus was occasionally cautiously drawn up and the Olives which were found adhering to the bait were taken into the boat in which the fishermen were.

Olivella, and *Scaphula*, Sowerby, and *Agaroma*, Gray, are sub-genera; 117 fossil and 20 recent species have been described. (Woodward, 'Manual of the Mollusca.')

(8639) VULOCAL, or Vulvaylum Maram, the Tamil name of a strong Ceylon wood which is used by the natives in making farming utensils. It grows to twenty inches in diameter, and twelve feet in height. The bark of this tree, with the Marandum bark and ginger, is used by the natives for cleaning and preserving the teeth.—*Edye, Ceylon.*

(8640) VULPES, Brisson, the generic name for a species of that sub-division of the great genus *Canis*, which has the pupils of the eyes elliptical or almost linear by day, though they become round or nearly so in the hours of darkness.

(8641) VULPES BENGALENSIS (Shaw) is brown above, with a longitudinal black band The space round the eyes is white, and the tail is terminated with black. It is the Fox of the Dukhun (Deccan), Kokree of the Mahrattas, *Canis Kokree* of Sykes, which the Colonel considers to be new to science, although it much resembles the descriptions of the Corsac, and is described by him ('Zool. Proc.,' 1831) as a very pretty animal, but much smaller than the European Fox.

(8642) VULPES VULGARIS (Brisson), the Common Fox; *Canis vulpes*, and *C. alopex* (the latter the variety it may be called, with the tip of the tail black?) of Linnæus; Volpe of the Italians; Raposa of the Snapish; Rapoza of the Portuguese; Fuches of the Germans; Vos of the Dutch; Raff of the Swedes; Rev of the Danes; Tod of the Scotch; Llwynog, fœm. Llwynogs of the Welsh, is too well known to require description. The time of gestation may be taken at from 60 to 65 days, and the birth of the young takes place in April. In a year and a half they attain their full size, and have been known to live 13 or 14 years; but as this can only have been ascertained, observes Mr. Bell, of individuals in confinement, it is very probable that, in a state of nature, it considerably exceeds that period. Of its cunning much has been said, and a great deal of it is true. The reader will find some interesting remarks on the habits and economy of the Common Fox by Dr. Weissenborn in the number of 'Loudon's Magazine' (R. S.) for October 1837. The Common Fox inhabits, according to Linnæus, Europe, Asia, and Africa. Cuvier mentions it as reaching from Sweden to Egypt, both inclusive. Mr. Strickland notes it as occuring near Smyrna. The Fox named Melanogaster by Prince Bonaparte in his 'Fauna Italica' is probably a variety only. The strong smell proceeding from the anal glands and urine of the Common Fox is very offensive.

(8643) *Canis Himalaicus*, The Hill Fox of the Europeans in the Doon, in Kumaon, and the more western and elevated parts of the mountains, agrees with the common European and American foxes (*C. vulpes* and *C. fulvus*) in the black marks on the backs of the ears, and in front of the hind and fore legs. The coat consists of long, close, rich fur, as fine as that of any of the American varieties, and of infinitely more brilliant and varied colours, (Royle, 'Flora Himalaica.') The following species of *Vulpes* are given in the 'List of the Specimens of Mammalia in the British Museum:'—*V. vulgaris*, the Fox; *V. flavescens*, the Persian Fox; *V. Azaree*, the Agouarachay; *V. Niloticus*, the Sabora; *V. Lagopus*, the Arctic Fox, or Peszi; *V. cinereo-argentatus*, the Kit-Fox; *V. fulvus*, the American Fox, or Makkeeshew; *V. Bengalensis*, the Kokree; *Magellanicus*, the Culpeo; *V. Corsac*, the Corsac; *V. Caama*, the Asse; *V. dorsalis*, the Senegal Fox; and *V. Zaarensis*, the Fennec. —*Eng. Cyc.*

(8644) VULTURIDÆ, a family of Raptorial Birds, whose geographical distribution is confined to warm climates, where they act as scavengers to purify the earth from the putrid carcasses with which it would otherwise be encumbered. It has been matter of dispute whether they are directed to their fetid food, for they seldom prey on living animals, by the eye or by the nasal organ. There can however, in our opinion, be little doubt that both the senses are made to contribute to the discovery of the carcass. The lofty flight and telescopic eye are well adapted to detect any dying or dead animal, and as the action of one vulture may be, in all probability is, watched by another, a sort of telegraphic communication as to the position of the object is kept up. [BIRDS; CONDOR.]

The *Vulturidæ* of Mr. G. R Gray from the first family of his first sub-order (*Accipitres Diurni*) of his first order (*Accipitres*). The following sub-families and genera are placed by Mr. Gray under this family:—

Sub-family 1. *Gypaetinæ.*

Genus:—*Gypaetos.*

Sub-Family 2. *Cathartinæ.*

Genera:—*Neophron*, *Cathartes*, and *Sarcoramphus.*

Sub-Family 3, *Vulturinæ.*

Genera:—*Gyps* (Sav); *Vultur*; and *Otogyps* (G. R. Gray).

Sub-Family 4. *Racaminæ.*

Genus:—*Gyphoierax*, Rupp.; *Racama*, J. E. Gray—*Vultur* (*Gyphoierax*) *angolensis*. We now proceed to give a few illustrative species:—

(8645) VULTUR AURICULARIS. The great African *V. Auricularis* has been observed in Greece, and has once been killed in France (in Provence): this resembles *V. Ponticerianus*, the so called 'King Vulture' common over the planes of India, but is much larger, equalling *V. Monachus* in size: while the latter has also an analogous diminutive in Africa, in the *V. Occipitalis.*

(8646) VULTUR CINEREUS appears to be the Vautour Arrian and Vautour Noir of the French; Cinereous or Ash-Vulture and Bengal Vulture' of Latham; and Grauer Gier of the Germans. It is a native of Europe. It is found in lofty mountains, and the vast forests of Hungary, the Tyrol, and the Pyrenees; the south of Spain and Italy; accidentally in Dalmatia; more frequently in Sardinia; in Sicily; rarely in Italy, and never in the forests; very accidently in Germany. Its food consists of dead animals and carrion, but never of living animals, of which it shows fear; the least animal, says Temminck, terrifies it. This is the genus *Gyps* of Savigny. Mr. Gould, in his great work on the 'Birds of Europe,' notices a deviation in this species from the true or more typical vultures, manifested in the partially bare neck, open ears, curved claws, and powerful beak.

(8647) VULTUR INDICUS, the Indian Vulture, has the head and neck denuded of feathers; all the upper plumage Isabella ash colour varied with brown and whitish; lower parts spotless very bright yellow; a slight short deep brown down, close set and very smooth, covers the breast; bill black, but the point lighter; naked skin of the head rusty ash. It is about the size of a turkey Total length 3 feet 3 inches. It is found in India and Ceylon. It is very voracious. It lingers all day near the sea-shore to prey on the dead fish thrown up by the waves. The species lives generally on carrion, and is said to disinter corpses. The flight of these vultures is heavy, and, like their congeners, they sometimes assemble in vast numbers on the battle-field.

(8648) VULTUR KOLBII, Kolbe's Vulture. This is the Stront-Jager of Kolbe, and the Chasse-Fiente of Temminck. The head is covered with downy ferruginous feathers, which are whitish on the back of the neck; a ruff of loose ferruginous or dirty white feathers round the back of the neck; cere blackish; iris black; back and wings ferruginous or gray-brown; quills black; belly rather lighter ferruginous; feet brownish; claws black. Size less than that of the Griffon Vulture, but in general aspect and plumage very like that species. It is however easily distinguished. In Kolbe's Vulture the feathers of the wings and of the lower parts are all rounded at the end. In the Griffon Vulture they are long and acuminated. In Kolbe's Vulture the ruff is neither so long nor so abundant as in the Griffon, and the adult is nearly entirely of a whitish-Isabella colour. The adult Griffon is uniform bright brown throughout. It is found in Barbary, and different parts of Africa, India, and Java.

(8649) *Gypaetus barbatus*—This is the celebrated Lammergeier. It is the Avoltoio Barbuto of the Italians; the Weisskopfige Geier Adler, and Bartadler of the Germans; and Bearded Vulture of the English. Head and upper part of the neck dirty white; a black stripe extends from the base of the beak, and passes above the eyes; another, arising behind the eyes, passes over the ears; lower part of the neck, breast, and belly, orange red; mantle, back, and wing-coverts, deep gray-brown, but on the centre of each feather is a white longitudinal stripe; wings and tail feathers ashy-gray, the shafts white; tail long, very much graduated; beak and claws black; feet blue; iris orange; eye surrounded by a red lid. Length about four feet seven inches. According to the age of the bird the plumage varies as follows:—there are brown feathers more or less on the top of the head; those of the lower part of the neck, breast, and belly often terminated with black; the whole white on the middle of the feathers of the back and the coverts of the wings more or less developed; the belly often of a gray brown or variegated with white; iris of a more or less deep orange colour. The young in the first two years have the head and neck of a brown-black; the lower part of the body gray-brown with spots of dirty white; on the upper part of the back are great white spots; the mantle and the wing coverts are blackish with brighter spots; quills blackish-brown; iris brown; feet livid. It inhabits the highest mountains of Europe, Asia, and Africa, the chain of the Pyrenees, and the Helvetian, Alps, Sardinia, Greece, and the Tyrol. In Asia, the chain of the Caucasus, the Himalaya Mountains, the Siberian and Persian Mountains. It is also found in the lofty mountains of Central Africa and towards the borders of the Red Sea, principally in the most inaccessible parts of those mountains, and where there is plenty of the larger sort of game. "Unlike the typical vultures," says Mr. Gould, "which are distinguished by their bare necks, indicative of their propensity for feeding on carrion, the Lammergeyer has the neck thickly covered with feahers, resembling those of the true eagles, with which it also accords in its bold and predatory habits, pouncing with violent impetuosity on animals exceeding itself in size; hence the young Chamois, the Wild Goat, the Mountain Hare, and various species of birds find in it a formidable and ferocious enemy. Having seized its prey, the Læmmergeyer devours it upon the spot, the straight form of their talons disabling them from carrying it to a distance. It refuses flesh in a state of putrefaction, unless sharply pressed by hunger; hence nature has limited this species as to numbers: while, on the other hand, to the Vultures, who are destined to clear the earth from animal matter in a state of decomposition, and thus render the utmost service to man in the countries where they abound, she has given an almost illimitable increase."

(8650) *Neophron percnopterus.* This is the Vautour Ourigourap of Le Vaillant, the Rhachamah or Pharaoh's Hen of Bruce and others, Avoltoio Aquilino and Caporaccajo of the Italians, and Maltese Vulture of Latham. Head and only the front of the neck covered with a naked skin of a livid yellowish colour; the whole plumage pure white, except the great quill-feathers, which are black; feathers of the occiput long and loose; cere orange, iris yellow, mandibles blackish; feet livid yellow, claws black, tail very much graduated. Length two feet and a few inches. According to age, the bird varies in its plumage, being either deep brown spotted with rusty, or bright gray-brown varied with white and yellow feathers. In this state the naked part of the head is livid, the cere white slightly tinged with orange, the iris brown, and the feet livid white. The young in the first year have the naked part of the head livid, covered with a thin gray down; cere and feet gray ash; the whole plumage deep brown varied with yellowish-brown spots; greater quill-feathers black; iris brown.

It is found (very rarely) in the north of Europe, in Switzerland in the neighbourhood of Geneva. Very common in Spain on the Pyrenees, Portugal, Malta, Turkey, and in the Archipelago. No where so abundant as in Africa. Russia as far north as Astracan, Arabia, Persia; the Deccan (Col. Sykes).

(8651) VULTUR LEUCONOTUS, the Chinese Vulture. This bird is brownish-black; lower part of the back white, as are the wings beneath and the inside of the thighs; when the wings are closed the white on the back is not seen; head brownish-black with short dark hairs; back of the neck covered with whitish down, the front of it livid flesh-colour and bare; at the bottom of the back of the neck is a dirty white ruff; on each side white feathers lap over the bottom of the neck and the crop; the cere is blackish; the bill horn-colour, black at the tip; iris dark; legs dirty brown-white with black scales; claws black. It is the size of a turkey.

(8652) VULTUR PONTICERIANUS, the Pondicherry Vulture. The adult is about the size of a goose; a long loose naked membrane or wattle takes its origin about an inch below the meatus auditorius, and widens into a rounded form in the middle; the whole head and neck naked and flesh-colour, but there are some short scattered hairs thereon; crop covered with a small brown down, and round it is a longer white down The young with the head and neck more or less clothed with short down. (Temm.) It is a native of Bengal (probably spread over the continent of India), Java, and Sumatra.

(8653) *Vultur Fulvus*, the Griffon Vulture, is Le Griffon of the French; Weisskopfiger Geier of the Germans; Avoltoio di Color Castagno of the Italians. Head and neck covered with close-set, short, white, downy feathers; lower part of the neck surrounded with a ruff of long, slender, white feathers, sometimes with a slight tinge. On the middle of the breast a space furnished with white down. The whole of the body, the wings, and the origin of the tail yellow-brown or Isabella colour; quills and tail-feathers blackish-brown; beak livid-yellow, cere darker [Temminck describes it as flesh coloured;] iris hazel; feet gray or light-brown. Total length exceeding four feet. The female is larger than the male. The young have a whitish down varied with brown on the head and neck; the rest of the body very bright yellow, marked with great spots of gray or white. It is a native of the mountainous parts of the north of Europe, Silesia, the Tyrol, Dalmatia (where it is very numerous), Spain (abundant near Gibraltar), the Alps, the Pyrenees, Turkey, the Grecian Archipelago, the north of Persia, and the north of Africa. The nest of this Vulture is generally formed upon the most elevated and inaccessible rocks but it often builds on the highest forest-trees, and in Sardinia on the loftiest oaks, where the nest of brushwood and roots is more than three feet in diameter. The eggs, which are generally two in number, though some state that it occasionally lays as many as four, are of a dull-greenish or grayish-white, slightly marked with pale reddish spots, and with a rough surface. Like all the other *Vulturidæ*, it feeds principally upon dead carcasses, to which it is frequently attracted in very considerable numbers. "When it has once made a lodgment upon its prey, it rarely quits the banquet while a morsel of flesh remains, so that it is not uncommon to see it perched upon a putrefying corpse for several successive days. It never attempts to carry off a portion even to satisfy its young, but feeds them by disgorging the half-digested morsel from its maw. Sometimes, but very rarely, it makes its prey of living victims, and even then of such only as are incapable of offering the smallest resistance; for in a contest for superiority it has not that advantage which is possessed by the Falcon tribes, of lacerating its enemy with its talons, and must therefore rely upon its beak alone. It is only however when no other mode of satiating its appetite presents itself, that it has recourse to the destruction of other animals for its subsistence. After feeding, it is seen fixed for hours in one unvaried posture, patiently waiting until the work of digestion is completed, and the stimulus of hunger is renewed, to enable and to urge it to mount again into the upper regions of the air, and fly about in quest of its necessary food. If violently disturbed after a full meal, it is incapable of flight until it has disgorged the contents of its stomach; lightened of which, and freed from their debilitating effects, it is immediately in a condition to soar to such a pitch as, in spite of its magnitude, to become invisible to human sight. In captivity it seems to have no other desire than that of obtaining its regular supply of food. So long as that is afforded it, it manifests a perfect indifference to the circumstances in which it is placed." (Bennett.)

(8654) VUNDOOROO WOOD.

Vundooroo kurra, Tel.

(8655) VUTTOMS. In Southern India pieces of cast steel, as they come from the crucible.

W.

(8656) WALAN, the name of a tree in Amboyna, which was first described and figured by Rumphius, in his 'Herbarium Amboinense,' and called by him *Ichthyoctonos montana*. It is a large tree, and much valued by the natives of the island in which it grows. It is very rare, and the description of Rumphius is too imperfect to allow at present of its being assigned to any particular division of the vegetable kingdom.

The inhabitants of the isle of Amboyna use the bark of the roots for catching fish. Before it is used for this purpose it is powdered, and the process by the natives is always attended with a peculiar ceremony. The bark of the root is the part of the tree employed, and when it is collected for fishing, a large party attends. It is powdered by a single individual with a large stone, and whilst this process is going on, the rest lie round the stone in a circle; when all is over, a signal is given by one of them crowing like a cock; they then arise and collect the powder into little baskets which is reserved for use. In catching the fish other ceremonies are employed The party goes in the morning early, and after throwing the powder upon the water and mixing it till it foams, they cast a net over the river, and then retire from the river, maintaining a death-like silence till the poison has acted on the fish In the course of an hour the net is generally found full of half-dead fish. The fish will recover from the effect of the poison if thrown into fresh-water, and are quite wholesome as food, although they will not keep so long as fish caught by other means. Rumphius procured some of the bark, and, omitting the ceremonies, found it a very successful mode of fishing.—*Eng. Cyc.*

(8657) WALKERA, a genus of Plants named after Richard Walker, D. D., founder of the botanic garden at Cambridge. It belongs to the natural order *Ochnaceæ*, and is known by possessing 5 petals, 5 stamens with ovate anthers; an obovately kidney-shaped fruit, which is a drupe; an inverted embryo with a hooked beak. There are two species of this genus known. *W. serrata* has serrate crenate leaves, racemes of flowers somewhat corymbose, and the lobes of the calyx lanceolate. It is a native of Malabar and Ceylon, and has yellowish flowers and reddish fruit The roots and leaves are very bitter, and are used in decoction by the inhabitants of Malabar as a tonic and anthelmintic. *W. integrifolia* is a native of French Guyana, and has entire leaves. —*Eng. Cyc.*

(8658) WALL FLOWER, CHEIRANTHUS.

(8659) WALLICHIA, a genus of Plants belonging to the natural order *Bytlneriaceæ*, named in honor of the late Dr. Wallich, superintendant of the East India Company's Botanical Garden at Calcutta.—*Eng. Cyc.*

(8660) WALLICHIA OBLONGIFOLIA, the Ooh of the Lepchas, a palm which grows in Sikkim. It affords an admirable fodder for horses, who prefer it to any other green food to be had in those mountains.—*Hooker Vol.* I. *p.* 143.

(8661) WALNUTS.

Akroot Jowz, Khusif, ARAB.
Noix, FR.
Akroot, Guz, HIND.
Char-mughz, Geerdighan, Jouz-i-roomie, PERS.
Okher. NEP.

The fruit of a large tree (*Juglans regia*), indigenous to Persia, and the countries bordering on the Caspian Sea. It has long been introduced into Great Britain. The fruit is a pretty large, smooth, ovate nut, containing an oily kernel, divided into four lobes. They are made into pickle and ketsup; and the dried ones are served up, in a bruised state, at desserts. Persian walnuts are the most esteemed, and are the only sort met with in India.—*Faulkner.* See JUGLANS.

(8662) WALNUT INDIAN.-Vide ALEURITES TRILOBA.

(8663) WALNUTS, UKROT, grow on the Himalayas and Cashmere. Walnuts are occasionally brought from Rangoon; but it is not certain that they are the produce of the indigenous walnut *Juglans arguta* tree of Tenasserim.—*Mason.*

(8664) WALSURA PISCIDIA.

Wallursi, TEL.
Walsura, TAMUL.
Joe-boe, BURM.

A native of the Circar mountains; flowers during the cold season. Roxburgh informs us that the bark thrown into ponds intoxicates the fish, which are consequently very easily taken. The fish are not deemed unwholesome. —*O'Shaughnessy. Walsura piscidia* is very plentiful in the Pegu and Tounghoo Forests, as well as in the Tharawaddey Forests. The timber is large, heavy and strong. Wood, white colored, adapted to every purpose of house-building. —*McClelland.*

(8665) WALSURA ROBUSTA. Another species of Walsura, (Robusta) exists in Sylhet, but the bark is not employed as a fish poison. —*O'Shaughnessy, page* 247.

(8666) WANEDILE. A rather hard, fine, close even-grained, heavy Ceylon wood.

(8667) WATCHES.

Montres, FR.
Uhren Taschenuhren, GER.
Guryall, GUZ. HIND.
Sahut, PERS.
Karmannue taschasn, RUS.

Oriuoli da tasca, o da saccoccia, It.	Reloges de faltriquera, Sp.

Are pocket time pieces composed of wheels and pinions,—a regulator to direct the quickness or slowness of the wheels, and a spiral spring which communicates motion to the whole. *Waterston.—Faulkner.*

(8668) WATER CRESS. NASTURTIUM The leaves, loot putha. The seeds, hurufs, Herb (recent) and seeds of Nasturtium officinale. The Water Cress is a native of Great Britain. Is generally raised from slips. It thrives best in running streams, and is to be had all the year round. It is grown from seed in beds near a water course, and the supply may be kept up for any length of time. A small black caterpillar is very destructive to it : the only remedy is flooding the plants for a short time.—*Jaffrey.*

(8669) WATER FOWL. An enormous quantity of water fowl breed in *Tibet* including many Indian species that migrate no further north. The natives collect their eggs for the markets at Jigatzi, Giantchi, and Lhassa, along the banks of the Yaru river, Ramchoo, and Yarbru and Dochen lakes. Amongst other birds the Sara, or great crane of India (see "Turner's Tibet," p. 212), repairs to these enormous elevations to breed. The fact of birds characteristic of the tropics dwelling for months in such climates is a very instructive one, and should be borne in mind in our speculations upon the climate supposed to be indicated by the inbedded bones of birds.—*Hooker, Him. Jour. Vol.* II. *page* 161.

About two days journey from *Delhi* is the Nujjufghur jheel, a great marsh covered with water fowl. The method of capturing them there, accords with the practice that obtains in other parts of India. Earthen vessels, wide enough to admit a man's head into them and perforated with small holes, are allowed to float about for days on the surface of this " Jheel," until the ducks, teals, and water-fowl in general, seeing them daily, become quite accustomed to the sight and fearlessly swim around and even approach and peck at them. This preparatory step, is followed by the fowler supplying himself with a wooden float, strong enough to support him. Using it like a hobby-horse under him, he launches himself into the swamp with an earthern vessel over his head, of a similar size and kind and similarly perforated as those indicated above. The float is dispensed with in many parts of the marsh that are shallow. The fowler likewise supplies himself with a bag of net work, which is tied round his waist, and thus equipped he silently paddles himself along with his hands under water, until he gets among the earthern vessels and fairly amid the birds. He commences his task by quietly and patiently pulling them down one by one by their legs, and putting them into the bag, which is so well adjusted round his person, that the struggles of the birds do not scare away the rest. Some use small baskets of wicker work with a lid of the same material which answer the purpose better. When the bag or basket is full, the fowler recedes to the spot whence he set out on his aquatic expedition and there empties the contents into a basket large enough to contain about four or five times the number of the small one and then begins anew. Large nets are also laid out on favorable sites, towards which the ducks &c., are driven and are thus taken in great numbers. Mr. French was not aware if the decoy-bird is known among the natives or if they adopt one as a means of entrapping others of its species. These helpless creatures are sold at from 25 to 30 for a Rupee which itself is an indication of their being very numerous and numerously caught.—*Tour of India by French, Page* 193.

In *China*, the fenny margins of lakes and rivers and the marshes on the sea-coasts, afford both food and shelter to innumerable flocks of water-fowl. The banks along the wide delta of the Pearl river and the islands in it, are frequented by immense flocks of geese teal, ducks and other birds; and they are likewise very abundant and tame along the inland water-courses. Ducks are sometimes caught by persons who first cover their heads with a gourd pierced with holes, and then made into the water, where the birds are feeding ; these previously accustomed to empty calabashes floating about on the water, allow the fowler to approach and are pulled under without difficulty. The wild goose caught on the shores of the Pearl river and the common goose of Chinese farm-yards do not differ much, both of them being a plain ashy grey color with a large knob at the base of the upper mandible, the domesticated species is almost too gross for the table from the ease with which it fattens. This bird and the mandarin ducks are both considered as emblems of conjugal fidelity and a pair of one or the other usually form part of wedding processions. The epithet mandarin is applied to this beautiful fowl, and also to a species of orange simply because of their excellence and beauty over other species of the same genus and not as some writers have inferred, because they are appropriated to officers of Government.—*Williams' Middle Kingdom, page* 263. The yuen-yang, as the Chinese call this duck is the native of the central provinces and is reared chiefly for its beauty. It is one of the most variegated birds known, vying with the humming birds and parrots in the diversified tents of its plumage, if it does not equal them for brilliancy.—*Williams' Middle Kingdom, page* 264.

(8670) WATER-LILY, the common name for the species of the family *Nymphæaceæ.* [NYMPHÆADEÆ.] One of the most beautiful and the largest of the tribe is the *Victoria Regia.* This splendid plant, in the dimensions of its leaves, their varied tints, the colour, size, and fragrance of its flowers, may deservedly be called the queen of flowers. The following is the account of its discovery by Sir Robert Schomburgh:—"It was on the 1st of January, while contending with the difficulties nature opposed in different forms to our progress up the river Berbice, that we arrived at a point where the river expanded and formed a currentless basin. Some object on the southern extremity of this basin attracted my attention; it was impossible to form any idea what it could be, and, animating the crew to increase the rate of their paddling, we were shortly afterwards opposite the object that had raised my curiosity—a vegetable wonder. All calamities were forgotten; I felt as a botanist, and felt myself rewarded;—a gigantic leaf, from five to six feet in diameter, salver-shaped, with a broad rim, of a light green above and a vivid crimson below, resting on the water. Quite in character with the wonderful leaf was the luxuriant flower, consisting of many hundred petals, passing in alternate tints from pure white to rose and pink. The smooth water was covered with the blossoms, and as I rowed from one to the other I always observed something new to admire." The leaves are very large, measuring five or six feet in diameter. They have an orbicular form, the upper surface is bright green, and they are furnished with a rim round the margin from 3 to 5 inches in height; on the inside the rim has a green colour, and on the outside, like the under surface of the leaf, it is of a bright crimson; they have prominent ribs, which project an inch high, radiating from a common centre; these are crossed by a membrane, giving the whole the appearance of a spider's web; the whole leaf is beset with prickles, and when young is convolute. The calyx is 4-leaved, each sepal is 7 inches in length and 4 inches broad; the corolla covers the calyx with hundreds of petals; when first opened it is of a white colour, but subsequently changes to pink; it is very fragrant. Like all other water-lilies, its petals and stamens pass into each other, a petal often being found surmounted with half an anther. The seeds are numerous, and imbedded in a spongy substance. This plant has by some botanists been placed in the genus *Euryale*, whilst Lindley thinks it is nearer *Nymphæa*, from which it differs in the sepals and petals being distinct, the papilla of the stigma being prolonged into a horn, and the changing colour of its petals. This splendid plant has now been successfully cultivated in many of the hot houses of England. Beautiful specimens are to be seen in the Royal Gardens at Kew, and at the Cyrstal Palace, Sydenham.—*Eng. Cyc.*

(8671) WATER LILY. Vide Nelumbium and Nymphæa.

(8672) WATERS, MINERAL. Mineral waters derive their distinctive characters from the formations or strata through which they flow. Those of the primitive formations are almost all thermal, and generally possess a high temperature. Those of the older secondary formations are generally of a lower temperature. The newer, secondary, and the tertiary strata, give forth cool mineral waters. The chemical contents—sulphuretted hydrogen, free carbonic acid, carbonate of soda, other salts of soda and of lime, silica, sulphate of magnesia, oxide of iron, free sulphuric and muriatic acids—vary in almost every individual case; but there is a general tendency in mineral waters from the primary formations to a sort of similarity of chemical contents, and so likewise in respect to the secondary and tertiary formations. Leaving out *thermal* waters, which are not designated mineral waters unless for some additional quality besides their high temperature, mineral waters are often classed into *saline*, *alkaline*, *chalybeate*, and *sulphureous*. Most of the celebrated Spas belong to one or other of these four classes,—the Cheltenham, Leamington, Harrogate, Carlsbad, Marienbad, Kissingen, Wiesbaden, Seidlitz, and Baden Baden waters are saline-aperient, some hot and some cold; or, rather, it should be said that *some* of the springs at these places are saline-aperient; for there are other springs at the same towns possessing very different qualities. Alkaline waters are met with at Bath, Cheltenham, Leamington, Harrogate, Scarborough, Carlsbad, Marienbad, Kissingen, Toplitz, Wiesbaden, Vichy, and many other places. Among the places at which chalybeat waters, or water in which the iron is associated with much free carbonic-acid gas, are met with, are Tonbridge, Harrogate, Brighton, Peterhead, Aix-la-Chapelle, Spa, Pyrmont, Schwalbach, Marienbad, and Seltzer. Sulphureous waters are found at Moffat, Askern, Harrogate, Aix la Chapelle, and other places. It will be seen that Harrogate possesses a large variety of these mineralized waters. A small number of springs contain iodine, and are on that account useful in certain maladies. There are springs of this kind at Tewkesbury, Cheltenham, Gucester, Leamington, Builth, Llandrindod, and Kreuznach. Some others contain a little bromine, and a few contain both iodine and bromine.—*Tomlinson.* See Hot springs; Mineral Waters; Springs and Thermal springs.

(8673) WA-WEI. A vegetable poison used by the natives of the Somali Coast and others in the interior of Africa, for poisoning their arrows. It is an inspissated decoction of the root of a tree which is not determined, but is supposed by Dr. Cleghorn to be one of the Laganiaceæ or Apocynaceæ. It is used both in hunting and in war, and is said not to be poisonous if swallowed.—*Madras Museum, Captain L. Playfair.*

(8674) WAX, Bees Wax.

Shuma, Arab.
La, Chin.
Miettie, Cyng.
Wasch, Dut.
Cire, Fr.
Wachs, Ger.
Mome, Guz. Hind.
Cera, It.
Cera-alba, Lat.
Lelin, Mal.
Moom. Pers.
Wosk, Rus.
Siktha, Sans.
Cera, Sp.
Melloogoo, Tam.
Minum, Tel.

Wax, an organic product of considerable importance, is obtained from different sources, the chief of which is the bee-hive, where it is used by the bees in the formation of their cells. It has long been a matter of dispute among naturalists, whether the bee collects wax already formed in plants, or secretes it from sugar in the mechanism of its body. The latter view of the case, in accordance with the origininal observations of Huber, is that which is now generally adopted. It appears that those working bees, to which the manufacture of wax is assigned, take a quantity of honey or sugar into their stomachs, suspend themselves in a festoon, by each insect attaching the claws of its fore-legs to those of the hind pair of the insect above it, and in this way, forming a number of festoons crossing one another in all directions, they appear like a dense curtain. They remain in this position for 24 hours, during which the secretion of wax takes place. The secretion is formed in certain membranous bags in the body of the bee; and, as the secretion goes on, the wax oozes through the membrane, and forms in thin plates on the outside. The process being complete, one of the insects detaches itself from the rest, proceeds to the top of the hive, and begins to build. It grasps one of the plates of wax by means of a pincer, formed at one of the joints of the leg, and draws it forward, when it is conveyed by one of the fore-claws to the mouth. The insect, with its mandibles and proboscis, reduces the plate to a riband of wax, softening it with a frothy kind of liquor, which makes it white and ductile, The other insects proceed in a similar manner. and with such celerity, that in a new hive, a comb 20 inches long by 7 or 8 inches broad, will be constructed in 24 hours, and in five or six days the hive will be half filled. The wax thus produced is more or less yellow in colour, and has an odour resembling that of honey. The beautiful geometrical form in which it is arranged in the honeycomb is well known. When the wax has served its purpose in the domestic economy of the hive, it is collected for manufacturing purposes, by first allowing the honey to drain off, or to be pressed out, and then boiling the combs in water, with frequent stirring, that the wax may not burn. In this way the combs are completely melted, and the liquid is then poured through hair-bags, which are pressed as long as any wax continues to pass through. The sediment remaining in the bags is also boiled over again, and more wax extracted from it. During the operation, the wax from each bag is received in a vessel of cold water placed beneath it, and answering the double purpose of cooling the wax, and preventing it from sticking. The wax is melted a second and a third time, and passed through bags of increasing fineness on each occasion. Lastly, it is melted once more without water, and poured into pans or moulds wider at the top than at the bottom, and wetted with cold water to prevent sticking. The conical shape of the cake thus produced is advantageous in two ways; it is more easily disengaged from the pan, and it has all its sediment or dross collected into a small space at the under surface, and there is consequently less waste in removing it. The moulds are kept in a warm room until the wax has solidified, otherwise the cakes are apt to crack across the middle. This method, though commonly employed, is tedious, consumes much firing, and wastes a considerable amount of wax; for these successive meltings and removal of dross cannot be effected without loss. Attempts have been made to expedite the process; and those of Mr. Bagster "The Management of Bees," by Samuel Bagster, jun. London, 1834, recommend themselves by their simplicity. This gentleman gives directions for obtaining a marketable wax from the combs by a single operation, without either straining or pressing, in the following manner. In an earthen vessel, much narrower at bottom than at top, is placed water and *aqua fortis*, in the proportion of 1 ounce of the latter to every quart of the former. When these are well blended, as many good wax-combs are put in as will reach, when melted, to within a finger's length of the top of the pan. The pan is then set on a clear fire, and stirred while the wax is melting, and until it has boiled long enough to liquefy the whole completely. It is then removed from the fire, and allowed to cool gradually. The wax then forms into a cake at the top, and the impurities are underneath: these arrange themselves in two layers, the lowest of which consists almost entirely of dross, but the next contains a certain amount of wax. When the cake of wax is turned out of the pan, both these drossy layers are removed, leaving the cake pure; but the upper drossy layer is boiled over again with more combs, and with any scrapings which it may have been necessary to make from the upper surface of the wax in order to leave it quite free from extraneous matters. Old combs that have wax in them, or other descriptions of refuse that have been pressed, but yet retain a considerable portion of wax, are pressed down in a close tub or vessel in a house for five weeks. This causes the impurities to ferment and rot, without affecting the wax, which may then be treated as above described, and will yield a fine yellow wax, little inferior to that of the best combs. Where very great purity is required, the best empty virgin combs are put into the same kind of vessel employed in the preceding process, but with only a quarter of a pint of water, to keep the wax from burning The pan is then set over a clear fire, and stirred until it boils. At this time a clear yellow froth begins to rise up, which froth is to be skimmed off into a pan placed close at hand. The fire must be so managed that this froth shall continue to rise without boiling over, and a succession of skimmings are thus obtained which form a very pure description of wax. When no more froth will rise, the residue is turned out into a vessel of cold water, and can be boiled up again with other combs. This method is only available with a fine comb. By the above processes, bees-wax is freed from impurities, but is not deprived of its natural yellow colour. For the greater number of uses to which the substance is appropriated, it is, however, necessary that the wax should be rendered perfectly white. This is effected by exposing it in thin ribands on a bleaching ground, where it is subjected to the action of light, air, and moisture, and loses both colour and odour. Similar substances, but obtained from the vegetable world, are of far less importance than the product of the bee, yet they are deserving of notice. Several species of myrtle (*Myrica*) yield the product called *Myrtle-wax*. This is especially obtained from *Myrica cerifera*, which flourishes in Louisiana, the berries of which are incrusted with wax. By boiling these in water, a quantity of hard brittle wax of a pale green colour is obtained, of the specific gravity 1·015, the fusing point being 110°. A somewhat similar wax is obtained from *Myrica cordifolia*, a shrub which grows at the Cape of Good Hope. The stems and leaves of palm-trees also secrete the substance called *Palm-wax*. Such is the hard brittle greenish yellow wax which we obtain from Rio de Janeiro. It is soluble in boiling alcohol and ether; it fuses at about 163°. A white and crystaline wax, resembling spermaceti, is obtained from a kind of sumach, *Rhus succedaneum*, and is known in commerce as *Chinese* or *Japan wax*. It is soluable in naphtha, but scarcely so in alcohol and in boiling ether. It forms a soluble soap when boiled in a solution of caustic potash. It fuses at about 180°. Another wax, having the same fusing point, is found upon a hard and ligneous variety of the sugar-cane, and is known as *sugar-cane wax* and *cerosine*. This is soluble in boiling alcohol, but sparingly so in boiling ether. By boiling the bark of the cork-tree, *Quercus suber*, in alcohol, and distilling off the alcohol, a quantity of yellow crystals are obtained which form *cork-tree wax*, which may be purified by repeated solution and crystallization. Nitric acid converts this substance into a peculiar acid, called *cerinic acid*. The demand for wax is great in Roman Catholic countries, where gigantic candles of this substance are required for the service of the several altars; but the great improvement in the manufacture of composite candles has reduced the demand for wax candles as an article of domestic use. For the manufacture of wax candles and tapers, see Candle. The amount of wax produced in England is very large, but a considerable quantity is likewise imported from abroad. In 1840, nearly 4,000 *cwts.* were imported from the western coast of Africa, nearly 2,000 *cwts.* from Tripoli, Tunis, &c., and more than 1,000 *cwts.* from the East India Company's territories. This was at a time when the very heavy duty of 10*s.* per *cwt.* was laid upon this article. In 1842, the duty was reduced to 1*s.* and 2*s.* the *cwt.* The adulteration of this substance was great during the existence of the heavy duties, and is still practised to a less extent. The adulterants of yellow wax are earth, pea-meal, resin, &c. Those of white wax are white oxide of lead, white tallow, and potato-starch. Oxide of lead may be detected by simply melting the wax in water, when the oxide falls to the bottom; tallow is discovered by the dull opaque white which it gives to the wax, and starch is detected by means of sulphuric acid, which carbonizes the starch without acting on the wax. —*Tomlinson. In India*, Wax is obtained from West Coast of Africa, Barbary, Malabar, Zanzibar, and in small quantities from the West Indies, United States, Germany, France, &c. —*Waterston.* In 1851, Vegetable wax was sent from Shanghae, in China; from St. Domingo, in the northern parts of which the plant is indigenous; and a remarkable specimen from Japan. This substance, from its high melting point and other physical characteristics, has of late attracted a good deal of attention; it is admirably suited as a material for the manufacture of candles.—*Simmonds.* The wax-insect tree of China, says Mr. Fortune, is no doubt a species of ash (fraxinus). It grows abundantly on the banks of ponds and canals in the province of Chekiang; and a small quantity of wax is also produced in this province. I was indebted to Dr. McCarter of Ningpo, for some beautiful specimens of the fresh insect upon the branches of this tree. This insect has been named *Coccus pela* by Mr. Westwood. When fully developed on the trees it has a most remarkable appearance; they seem as if covered with flakes of snow. The wax is an article of great value in Chinese commerce, and a small portion is exported.—*Fortune's Residence, p.* 146,

(8675) WAX CANDLES. Various descriptions of wax candles were formerly made in India.

(8676) WAX FLOWER. Vide Tabernaemontana.

(8677) WAX OIL. OLEUM CERÆ. Bees wax submitted to destructive distillation with the addition of a little salt yields an empyreumatic oil which is much used in medicine by Native Medicinists.—*M. E. J. R.*

(8678) WAX PLANT. HOYA CARNOSA.

(8679) WEBERA CORYMBOSA. SCHREB.

Terana pullum, TAM.

The fruit of this plant is a small black berry which is eaten by the poor people. It is the produce of a beautiful shrub of the class Pentandria and order Monogynia, which is rarely seen in low lands or in cultivated districts.—*Ainslie, p.* 233.

(8680) WEBERA TETRANDRA. Willd.

Caray cheddie, TAM. | Balusoo Kura, TEL.
Tsjerow Kata, MAL. | Naga Bulla, SANS.

A decoction of the edible leaves of this plant is prescribed in certain stages of Flux cases and the root is supposed to have anthelmintic qualities. Neither of them have much taste or any peculiar smell.—*Ains. Mat. Med. p.* 75.

The Greens.

Carray keeray, TAM.

The leaves of this thorny shrub are eaten as greens, common about Madras; and it produces a small fruit about the size of a pea which the Natives eat,—*Jaffrey.*

The bark.

Madoocare puttay, TAM. | Madoocare bark, ENG.

The young shoots of this plant, as also the bark, the Vyteans prescribe in certain flux cases. *Ains. Mat. Med. p.* 86.

The fruit.

Caray pullum, TAM. | Balusoo pundoo, TEL.
Karay ka phull, MAL | Naga Bulla, SANS.

This fruit is eaten by the common people.—*Ainslie, p.* 223.

(8681) WEIGHTS AND MEASURES. The original measures of the Malayese and Javanese were evidently by capacity (takâr) and not by weight, for which there are no words in their language except such as signify heaviness or balance. The lowest denomination for a measure of capacity among the Malayas goes under the name of chupak, most probaby taken from the shell of the cocoanut or the joint of the bamboo. Of this, 4 make a gantang, and 800 of the last a koyan. These are native words, with the literal meaning of which, however, I am unacquainted. The measures of length, as with other people, are taken from the members or parts of the human body, as finger-length, span, foot, pace, fathom, with the length from the foot of one side to the tip of the outstretched hand on the opposite one. Superficial or land measure is still more rude. Thus the Javanese, in reference to their irrigated land, the only description on which they set a special value, have, for the largest measure, what they term a jong, which, literally signifies a ship, and this divided into halves called kikil, or a leg, and into fourths called ban, which means a shoulder. Another admeasurement of land goes under the name of chachah, of which gawe-ning-wong is the synonym, the first word signifying "count" or "census," and the last, "a man's work," that is, the quantity of irrigated land that a family of peasantry can till. This last term is of the same nature as our own "plough-land." The business-like Chinese have introduced their own well-defined weights, although under native names. Thus we have the tail or weight of 23 drams, avoirdupois the kati consisting of 16 tails, and the piknul, which literally signifies a man's load or burden, composed of 100 katis or 133⅛ pounds, avoirdupois. The weights and measures of the Malays, with their denominations, have not only extended over the whole Malay Archipelago, but are also prevalent in the Philippines. In the settlements of European nations the weights and measures of the natives have been fixed with precision.—*Crawfurd, Dict. page* 446.

(8682) WEINMANNIA, a genus of Plants belonging to the natural order *Cunoniaceæ*, named after John William Weinmann, a botanist. The species are trees, and natives of South America and the Mauritius. The leaves are compound or simple, with reticulated petioles; the calyx is permanent and four parted; the petal, 4 stamens 8; an hypogynous, unceolated disc; the fruit a many-seeded capsule, opening at the dissepinents from the apex; the seeds are roundish and reniform. There are about 40 species of this genus described.—*Eng. Cyc.*

(8683) WEINMANNIA TINCTORIA, is a native of the Isle of Bourbon; it has leaves with many pairs of leaflets, which are oblong, serrated. and smoothish; the joints of the rachis spatulate and the fascicles of racemes many-flowered. This tree is called by the natives of Bourbon Tan Rouge, and is used for dyeing a red colour. Most of the species of *Weinmannia* possess astringent properties, and may be used for dyeing. On this account they are also often employed in Peru to adulterate the various species of Cinchona barks which are collected for medicinal purposes. —*Eng. Cyc.*

(8684) WHALEBONE. An elastic substance of the nature of horn, obtained from the upper jaws of the whale. These vary in size from three to twelve feet in length, and the breadth of the largest, at the thick end, is above a foot. Whalebone is applied to various useful purposes. *Faulkner.*

(8685) WHALES, of several varieties, abound in those parts of the ocean lying between the Bonins and the coast of Asia and are in greater numbers in the neighbourhood of Japan.—*American Expedition to Japan, p.* 243.

(8686) WHANGHEES, Japan Canes. A species of cane exported from China. The *Whangee* cane has pale, hard, bark, and flexible stem, with intervals of about an inch and a half or two inches and a number of little holes at the knots.—*Seeman*.

(8687) WHEAT.

Hinteh, Arab.
Hvede, Dan.
Tarw, Dut.
Froment, Bled, Ble, Fr.
Weitzen, Ger.
Gaon, Guz.
Gehoon, Hind.
Grano, Formento, It.
Gundum Pers.
Pszenica, Pol.
Trigo, Port.
Pschenzia, Rus.
Trigo, Sp.
Hyete, Sw.

One of the most valuable and diffused of the bread corns. It is extensively cultivated throughout India.—*Faulkner*. There are several distinct species of wheat, that which is chiefly cultivated in England is the Triticum vulgare ; of this there are two varieties—T. æstivum, or summer wheat ; and T. hybernum, or winter wheat : the former is sown in the spring, and the latter in the autumn : of these varieties, again, there are several different modifications, into the description of which it is, however, not necessary to enter on the present occasion. Wheat-seeds or grains as brought to the market, and as supplied to the miller, are deprived of their paleæ, or husks, which, when coarsely ground, form the article known as bran and pollard. The number of parts into which ground wheat is separated, and the amount of each yielded by given quantities, vary according to the characters of the wheat, and the processes adopted by different millers. In wheats, which are hard, the integuments separate with difficulty, and therefore the flour produced from these usually contains a greater proportion of adherent bran than do those flours procured from wheats which are soft, and which part with their epidermic coverings more readily. According to Mr. Hard, a miller of Dartford, in Kent, the following are the products with the quantities obtained, of one quarter, or eight bushels of ground wheat.

" Produce of one quarter of wheat, weighing 504 lbs.

Flour	392	,,
Biscuit, or fine middlings...	10	,,
Toppings or specks	8	,,
Best Pollard, Turkey Pollard, or twenty penny	15	,,
Fine Pollard	18	,,
Bran and coarse Pollard	50	,,
Loss sustained by evaporation, and waste in grinding, dressing, &c. ...	11	,,
-	504	lbs.

Dr. Hassell examined forty four samples of English, French and American flour, and in no one instance was any other farina than wheat flour observed, nor was the presence of foreign matters of any kind detected, either by microscopical or chemical examination. There are several distinct species of wheat, but the kinds cultivated in England is Triticum Vulgare, of which there are two varieties T. æstivum or summer-wheat and T. hybernum, or winter wheat, Wheat seeds or grains, as brought to the market are deprived of their paleæ or husks, which when coarsely ground, form the articles known as bran and pollard *Hussall*. All kinds of wheat contain water in greater or lesser quantities. Its amount is greater in cold countries than in warm. In Alsace from 16 to 20 per cent. ; England from 14 to 17 per cent. ; United States from 12 to 14 per cent. ; Africa and Sicily from 9 to 11 per cent. This accounts for the fact, that the same weight of southern flour yields more bread than northern, English wheat yields 13 lbs. more to the quarter than Scotch. Alabama flour, it is said, yields 20 per cent. more than that of Cincinnati. And in general, American flour, according to one of the most extensive London bakers, absorbs 8 or 10 per cent. more of its own weight of water in being made into bread than the English. The English grain is fuller and rounder than the American, being puffed up with moisture. The mode of ascertaining the amount of water in flour is this ; take a small sample, say five ounces, and weigh it carefully ; put it into a dry vessel, which should be heated by boiling water ; after six or seven hours, weigh it ; its loss of weight shows the original amount of water. The geographical range of the wheat region in the Eastern Continent and Australia, lies principally between the 30th and 60th parallels of north latitude, and the 30th and 40th degrees south, being chiefly confined to France, Spain, Portugal, Italy, Sicily, Greece, Turkey, Russia, Denmark, Norway, Sweden, Poland, Prussia, Netherlands, Belgium, Great Britain, Ireland, Northern and Southern Africa, Tartary, India, China, Australia, Van Diemen's Land, and Japan. Along the Atlantic portions of the Western Continent, it embraces the tract lying between the 30th and 50th parallels, and in the country westward of the Rocky Mountains, one or two more degrees further north. Along the west coast of South America, as well as in situations within the torrid zone, sufficiently elevated above the level of the sea, and properly irrigated by natural or artificial means, abundant crops are often produced. Wheat has, from time immemorial, been a staple crop in the plains of Northern India, and especially in the Punjaub. The climate and soil are well fitted for this cereal, but owing to defects and carelessness in the agriculture and harvesting, the crops, though excellent, fall short of what most corn-growing countries produce. Further—owing to foul boats and granaries, and to the moist heat of the months immediately succeeding harvest, the wheat reaches England in a state too dirty and weevelled for market. The hard wheat is preferred by the natives of India to the soft. Wheat is grown largely in Burmah, but Mr. Mason had never seen it under culture in the Tenasserim Provinces, although Commissioner Durand made an attempt to introduce it. No doubt, on the Karen mountains the cultivator would reap an ample harvest.—*Simmonds. Mason.*

(8688) WHEAT-MIDGE (Cecidomyia Tritici), a fly and its caterpillar, infecting wheat.—*Hassell.*

(8689) WHITE COPPERAS, White Vitriol, Sulphate of Zinc. Sal Vitrioli.

Sulfate de zinc, Fr.
Schwefelsaures, Zinkoyd, Ger.
Suffeid-Tootia, Guz. & Hind.
Zinci-sulphas, Lat.
Caburnic, Sans.
Vulley-tootum, Tam.
Tootum, Tel.

A salt formed by the union of sulphuric acid, with the oxide of zinc. It is found native in the mines of Goslar, and other places.—*Faulkner.*

(8690) WHITING FISH. Indian Whiting. Sciena. Lin.

Kullengan mutchie also Darya ka Shaikra, Duk.
Kellunga meen, Tam.

(8691) WHITE LEAD (Carbonate) of, Ceruse.

Asfeidaj, Arab.
Plom Carbonate, Fr.
Bleiweiss, Ger.
Cerussa, It.
Suffeidah, Guz. Hind.
Plumbi Carbonas, Lat.
Suffeidah, Kash, Pers.
Istibedsh, Turk.
Moothoo Vullay, Tam.
Seebaydoo, Tel.

Is usually made by suspending thin plates of lead over heated vinegar, the vapour of which corrodes the metal, and converts it into a heavy white powder. Mixed with oil it forms a common paint; it is also employed in medicine.—*Faulkner.*

(8692) WHITE PEPPER.

Piper-album, Lat.
Suffeid-Mirch, Guz. Hind.

The fruit of a slender climbing plant *(Piper nigrum)*, gathered after it is fully ripe, and freed of its dark coat by maceration in water. It is smooth on the surface; and is milder than the black-pepper. The plant is extensively cultivated in Malabar, Sumatra, Siam, Malacca, &c. —*Faulkner*

(8693) WIGHTIA. At Tonglo, in Sikkim, at an elevation of several thousand feet, Dr. Hooker found great scandant trees twisting around the trunks of others, and strangling them: the latter gradually decay, leaving the sheath of climbers as one of the most remarkable vegetable phenomena of these mountains. These climbers belong to several orders, and may be roughly classified in two groups.—(1.) Those whose stem merely twine, and by constricting certain parts of their support, induce death.—(2.) Those which form a net-work round the trunk, by the coalescence of their lateral branches and aerial roots, &c.: these wholly envelope and often conceal the tree they enclose, whose branches appear rising far above those of its destroyer. To the first of these groups belong many natural orders, of which the most prominent are—*Leguminosæ*, ivies, hydrangea, vines, Pothos, &c. The inosculating ones are almost all figs and *Wightia:* the latter is the most remarkable, for its grasping roots.—*Hooker Him. Jour. Vol.* I, *page* 163-164.

(8694) WILD ALMOND OIL. Terminalia Catappa. A specimen of oil said to be obtained from the fruit of this tree was exhibited in the "Madras Tariff" At the Madras Exhibition of 1851, a sample labelled "Almond oil" from Tanjore is the product of this species of Terminalia.—*M. E. J. R.*

(8695) WILLOW. Salix. A species of willow, is one of the most abundant forest trees of Tenasserim on the banks of inland streams; and as many of the willows are medicinal, it is very probable that this also possesses medicinal properties, but they are as yet unknown.—*Mason.* A species of willow, Roxburgh describes as "a native of banks of rivulets and moist places among the Circar mountains," but a species of willow on this Coast is met on every stream before the influences of the tide ceases to be felt.—*Mason.*

(8696) WILLUGHBEIA, a small East Indian genus of plants belonging to the natural order *Apocynaceæ*, named after Francis Willughby F. R. S.—*Eng. Cyc.*

(8697) WILLUGHBEIA EDULIS: Roxb. Fl. Ind. ii. p. 67.

Lutian, Hind.

Forests of Chittagong and Sylhet. A very large climber: every part of the plant on being wounded discharges an abundance of fluid caoutchouc. The fruit is pulpy, soft, and yellow, and esteemed by the natives,—*O' Shaughnessy, page* 448.

(8698) WILLUGHBEIA MARTABANICA, There is a species of Willughbeia in the forests that produces a fruit as large as an apple, which Europeans sometimes call "a kind of fig." It has an agreeable taste but abounds in a milky juice.—*Mason.* Its colour is yellow, and it is about the size of an orange.—*Eng. Cyc. page* 1256.

(8699) WINE.

Khumr, Arab.
Vin, Fr.
Wein, Ger.
Ungoor-ka-Shrab, Hind.
Vino, It.
Vinum, Lat.
Mei, Pers.
Vinho, Port.
Wino, Wino-grandnoe, Rus.
Madira, Sans.
Vino, Sp.

The fermented juice of the grape. There are a great many varieties of wines; and this circumstance, combined with differences of soil, climate, mode of preparation, &c., occasions an extreme variety in the species of wine—the chief of which are Port, Sherry, Claret, Champaigne, Madeira, Hock, &c.—*Faulkner.*

(8700) WINTERACEÆ, a natural order of Exogenous Plants. This order is characterised by possessing hermaphrodite or unisexual flowers; from 2 to 6 sepals, which are sometimes not to be distinguished from the petals; the petals are from 2 to 30 in number, and, when more than 5, in several rows; the stamens are hypogynous, short, indefinite, and distinct, arranged in a single whorl, 1-celled; the embryo is very small and straight, and situated at the base of a fleshy albumen. The order consists of small trees or shrubs, with alternate, dotted, coriaceous, persistent leaves; convolute deciduous-stipules; and solitary, sweet-scented, brown or chocolate-coloured flowers.

This order has obtained its name, given it by Brown, from *Winteria*, the old name of the *Drimys Winteri*. This name was given in honour of William Winter, a captain in the royal navy, who sailed round the world with Sir Francis Drake. It contains four genera—*Illicium*, *Temus*, *Drimys*, *and Tasmannia*.

These genera constitute the section *Illicieæ* of the order *Magnoliaceæ* of De Candolle, and the section *Wintereæ* of Lindley in the same order. They differ from *Magnoliaceæ* in their dotted leaves, and also in their aromatic qualities. There are about ten species, of which two are found in Australia, two in the hotter parts of America, two in South and two in North America, one in China and Japan, and one in New Zealand.—*Eng. Cyc.*

(8701) WINTERS BARK. A spice resembling *Canella alba*, contained from the *Wintera aromatica*, and on account of its aromatic and stimulant properties, has been used as a substitute for cinnamon. It is now seldom employed. —*Faulkner.*

(8702) WISTARIA, a genus of Plants belonging to the natural order *Leguminosæ*, named after Caspar Wistar, professor of anatomy in the University of Pennsylvania. It has the following characters:—The leaves are unequally pinnate, and without stipules. The flowers are arranged in terminal racemes, and are of a blue lilac colour: when young they are accompanied by bracts which fall off as the flowers expand. The calyx is campanulate, somewhat bilabiate, the upper lid has two short teeth, the lower lip three teeth, which are subulate; the corolla is papilionaceous; the stamens diadelphous; a nectariferous tube girds the stipe of the ovary; the legume is coriaceous, 2-valved, 1-celled, and rather torulose. The species are deciduous twining shrubs, natives of North America and China. They grow vigorously in Great Britain, and form in flower the handsomest ornaments of our gardens.—*Eng. Cyc.*

(8703) WISTARIA CHINENSIS, Chinese Wistaria, has the wings of the corolla each furnished with one auricle; the ovary villose; the flowers large. This plant is a deciduous twiner, and a native of China, and was introduced into England in 1816. It flowers in Great Britain in May and June, and sometimes produces a second crop of flowers in August. This species was originally called *Glycine Chinensis*, a name which in some places it still retains.—*Eng. Cyc.* In China Mr. Fortune saw a specimen of *Wistaria chinensis* in a dwarfed state, growing in a pot. The tree was evidently aged, from the size of its stem. It was about six feet high, the branches came out from the stem in a regular and symmetrical manner, and it had all the appearance of a tree in miniature. Every one of these branches was then loaded with long racemes of pendulous lilac blossoms. These hung down from the horizontal branches, and gave the whole the appearance of a floral fountain. *Page* 334.

(8704) WOAD.

Weede, Dut.
Pastel, Guede, Vouede, Fr.
Waid, Ger.
Guadone, Guado, Glasso, It.
Pastel, Glasto, Sp.

A plant (*Isatis tinctoria*), indigenous to most parts of Europe; from the roots and leaves of which, a blue dye is obtained. Woad is now entirely superseded by the use of Indigo.—*Faulkner.*

(8705) WOMEN'S CLOTHS, COTTON. In Southern India, this description of cloth is chiefly manufactured at the town of Arnee in the Collectorate of North Arcot; they are of various colours with borders; chiefly used by Brahmin women: they are of ordinary qualities and sold at from 2 to 12 Rupees each.

(8706) WOOD. See TIMBER. The most important application of wood, is in the building and repairing of houses and ships, and in the construction of machinery. For this purpose the large trees, which come under the denomination of *Timber*, are chiefly employed. The conservation of growing timber is an art of considerable importance and inattention to this duty has allowed nearly every forest in India to be denuded of its principal trees. —*Tomlinson.* The value of wood and timber in India, is not to be measured by the estimation in which they are held, in temperate climates. In India they are not only applied to those economic uses with which all are familiar, but they also furnish fuel to all classes, supplying the place of that valuable mineral, coal. Besides this, the influence of trees on climate is very considerable tending as they do, to prevent the too rapid withdrawal of moisture from the soil, a point of great importance in a country, where the heat of the sun is intense, and the supply of water is dependent only upon periodical falls of rain. The value of timber would be best shown by the vast extent, to which it is employed in the various purposes of life. It is impossible to ascertain the amount used in India, but the quantity of firewood alone imported by sea into Madras during 5 years is given below, that for 1849-50 being estimated by the Military Board to be equal to 12,000 tons.

Years.	Billets.	Value Rs.
1845-46	63,61,816	32,536
1846-47	42,77,013	22,746
1847-48	56,78,794	31,974
1848-49	104,75,590	58,026
1849-50	98,51,050	66,101

The above is exclusive of imports by Cochrane's Canal, and the trunk roads which the Military Board estimated at upwards of 85,000 tons per annum.

The trade Reports of the Madras Presidency show that the exports of the following 5 woods alone, amounted in value to 3,84,000 Rupees in 1854, viz :—

Sandalwood,	cwt.	11,684	137,944
Redwood,	,,	47,431	59,570
Sappanwood	,,	5,248	15,350
Ebonywood,	,,		4,859
Teak,	,,		216,368

The imports of timber into Great Britain alone in 1850, amounted to ten millions of cubic feet. See TIMBER.

(8707) WOOD APPLE GUM. Obtained from the *Feronia elephantum* is very abundant, and forms the well known "East India Gum Arabic." Mr. Rohde mentions that from its ready solubility without residue it gives the best mucilage for making Black ink.—*M. E. J. R.*

(8708) WOOD ENGRAVING. The following woods can be prepared for engraving upon.

Guava Psidium Pyriferum, (the best.)

Palay. Mimusops hexandra. A good wood but liable to be attacked by insects.

Veppalcy. Wrightia antidysenterica. A fine close grained wood not quite so hard as the guava, but improving with age

Jujube or bayr fruit tree. Zizyphus jujuba, rather soft.

Wood apple tree. Feronia elephantum, too coarse in the grain.

Satin wood. Swietenia chloroxylon. A close grained wood but apt to split.

(8709) WOOD OILS. This class of oils is obtained for the most part from the Burmese coast and the Straits. These are usually procured by tapping certain trees of the order Dipterocarpeæ, and applying heat to the incision. The oil which flows from the wound, is a mixture of a balsam and volatile oil, and when applied as a varnish to wood or other substance the oil evaporating deposits a hard and durable coat of resin. They are chiefly used as natural varnishes, either alone, or in combination with coloured pigments, also as a substitute for Tar in paying the seams of shipping, and for preserving timber from the attacks of white ants. They are said also to be useful as an ingredient in Lithographic inks.

Owing to the little frequented countries from which they are brought, and the imperfect knowledge we yet possess of the country whence they are imported, the names of the trees from which these valuable substances are derived, are involved in some degree of obscurity. The oils, therefore, generally receive the names of the localities from which they are imported. Some of them differ considerably in colour and consistence, but they all possess the same balsamic odour, and are derived from various of the noble family of Dipterocarpeæ. At the Madras Exhibition of 1855, in this section, were three good samples of wood oil from Canara: also, a very interesting series of ten oils from various parts of the Madras Presidency and Burmah. Lieut Evans 51st Regt. N. I., in addition to other contributions, exhibited a bottle of wood oil from Malacca in its natural state as procured from the tree. The mode of extraction is as follows:—about the end of the dry season, that is in March or April, several deep incisions are made with an axe into the heart of the wood, and a good sized piece scooped out, into these holes fire is placed, and kept burning until the oil begins to run, when it is received into a bamboo, and allowed to run slowly drop by drop."

(8710) WOOD OIL, as obtained from the tree without any preparation. This was obtained from Malacca, from a large tree of the Dipteraceous family, which is very common in the dense jungles of the Malayan Peninsula, and grows to a great height. When not tapped too soon, the base of the trunk is often of immense girth—the wood is reddish brown and has a smell not unlike that of English fir, the bark is smooth, the leaves alternate, pinnate and exstipulate, fruit a one seeded drupe, seed angular and anatropal. The oil when permitted to remain at rest divides itself into two layers, the upper consisting of a clear chesnut colored liquid balsam and the lower being in appearance like flakes of granulated sugar and consisting probably of the surplus resin deposited by the action of the atmosphere.

(8711) WOOD OIL, GURJUN BALSAM.

Telia Gurjun, BENG. GUZ HIND.

As found in the bazars, this substance generally occurs as a brown, oily-looking, semitransparent liquid ; in odour strongly resembling a mixture of balsam of capaiba with a small portion of naptha. One kind is yielded by the *Dipterocarpus laevis*, a native of Chittagong, Pegu, Assam, &c. It has been successfully used as a substitute for balsam copaiba, to which it bears a great resemblance in its physical and chemical properties,—*Dr. O'Shaughnessy.* Gurjun Oil, is, however, the product of several species of Dipterocarpus and known, generally, as wood oil, Gurjun balsam contains fixed resin, essential oil, and water. If the latter be not separated, it boils with explosive violence. The separation is effected by the dried muriate of lime. A small portion of the essential oil may be obtained by distillation with water in the common way. Gurjun oil is a good substitute for copaiba balsam in the treatment of gonorrhœa, given diffused through almond mixture or gum water. Dose ten to fifteen minims repeated thrice, daily, or as often as necessary.—*Beng Phar. p.* 378.

Compound Tincture of Gurjun, is an efficient substitute for "Franks" well known specific for the treatment of gonorrhœa. Dose, twenty to thirty minims, in a little milk or sugared water. —*Beng. Phar p.* 427.

Wood oil, Kurra noona. Tel. The following is taken from Captain Halsted's account of his visit to the island of Chedooba. The wood oil tree was the most conspicuous in growth and size of the larger trees of these summits. One was felled on the west hill which measured in diameter, at the respective ends of a 60 feet length, 4 feet 6 inches, and 3 feet 6 inches; and another is left standing as a mark, on the summit which measures 21 feet 4 inches in girth at 6 feet from the ground. The wood of this tree will not, I fear, be found valuable as timber, but its produce, the wood oil, has yet to be better appreciated than at present. This substance is produced by cutting a hole into the body of the tree, and kindling a fire in it; the flat floor as it were, of the hole, has a grove cut in it, which receives the oil as it exudes from the wound, whence a split bamboo conducts it to the pots placed for its reception, the quantity thus yielded from a large tree is surprisingly great. In felling the above mentioned individual the oil ran in a stream from it, and it must have contained seven tons. The strict propriety of designating it an oil may be doubted. It has always seemed to me more ike a varnish; it speedily forms a highly poished surface on wood, and has a fine aromatic scent, not unlike that of cedar: mixed with reeds and dried, it makes a brilliant and a fragrant orch. The color of the wood is a dull pink. —*Rohde M.S.S.*

(8712) WOOD OIL FROM CHINA. this valuable produce merits notice as being one of the substances of which the well-known and much prized China lacquer is made. It is used n Singapore for painting the beams and woodwork of Native houses, and may also be mixed with paint when not exposed to the sun.

(8713) WOOD OIL FROM CHITTAGONG. This substance much resembles the "Teak wood oil" and the "Wood oil from Pegu," above mentioned. It is less liquid than the latter, but s used for the same purpose; procurable in all arge bazars.

(8714) *Sissoo-wood Oil—Dalbergia sissoo.* An empyreumatic medicinal product.

(8715) *Camphor-wood Oil—Dryobalanops Camphora.*—This belongs to the class of "Volatile oils," but may be here noticed. The specimen exhibited by Lieut. Hawkes was forwarded to him from Singapore through Lieut. Heath of the 38th Regiment N. I., and another excellent specimen which was exhibited by Second Dresser Pulicandy was brought by him from Labuan. It is used largely in Singapore as a substitute for turpentine, and sells at from 15 to 20 cents a bottle.

(8716) *Deodar or Shemanatalu Oil.* Tam. Erythroxylon Areolatum. An empyreumatic medicinal oil.

(8717) WOOD OIL FROM PEGU. The Botanical names of the trees yielding this wood oil cannot with any certainty be ascertained. The oil which is generally known by this name is a very clear and liquid substance forming a natural varnish when applied to wood or other substances.

(8718) WOOD OIL FROM RANGOON. This appears to differ very considerably from any other specimen of "wood oil," it is quite white and almost solid—but has the usual resinous smell of this class of oils.

(8719) WOOD OIL FROM TINNEVELLY. An empyreumatic product similar to tar, chiefly used medicinally by Native Practitioners.

(8720) *Teak Wood Oil.* A dull ash colored oil under this name, is procurable in most of the large bazars of India; when allowed to rest for some time, it separates into two layers, the one an upper dark colored clear stratum and a lower and more solid deposit. Its chief use is for applying to wood work of all sorts, either alone as a natural varnish, or in combination with certain resins.

(8721) WOOD SORREL. Oxalis.

(3722) WOOL.

Uld, Dan.
Wol, Dut.
Laine, Fr.
Wolle, Ger.
Oonn, Guz. Hind.
Lana, It.
Lana, Lat.
Pushm, Put, Pers.
Welna, Pol.
La, Laa, Port.
Wolna, Scherst, Rus.
Lana, Sp.
Wull, Sw.

The fleecy covering or pile of the sheep. Wools are distinguished by their length of staple, and by the fineness of their filaments. It is an important article of commerce, and accordingly much attention is paid to the rearing of sheep in all civilized parts of the world, so as to render their wool as perfect as possible. Wool is largely imported into Bombay from the Persian Gulf, Kurrachee, Sonmeanee, Cutch, &c., and is re-exported to England.—*Faulkner.*

India.—The table-land of the Peninsula, commencing with the Neilgherries, and proceeding along Mysore to the Deccan, Candeish, and Guzerat, presents large tracts of country affording a favourable climate, and abundant pastures for numerous flocks of sheep. If from thence we proceed in a north-east direction, passing Marwar, Malwa, Rajapootana, to the district of Hurriana, and the province of Delhi, we shall see, supported on the natural pastures of the country, immense herds of cattle, and numerous flocks of sheep. The latter affording Wool employed by the natives for making blankets (*Kumlees*), of different degrees of fineness, which form a considerable article of the commerce of these provinces. Again, the Himalayan mountains, on their Southern face, present a European-like climate, remarkable however for being influenced by the periodical rains. The temperature varies according to the elevation; but they afford everywhere rich pastures, and support a fine breed of ship, of which the Wool is employed by the Mountaineers to form their clothing. The Northern face of these mountains is as remarkable for its dryness, as the Southern is for its moisture; the cold is excessive, and the animals which are pastured there are covered with shaggy hair, or with long Wool, and a fine down. It is here that the Shawl Wool Goat finds its most congenial climate. Mr. Moorcroft, who was deputed in 1814, to that part of Little Tibet, in Chinese Tartary, where the Shawl Goat is pastured, for the purpose of opening to Great Britain the means of obtaining the materials of the finest woollen fabric, found that the Hooneas were obliged to send all their best Wool to Cashmere. He mentions that "this is caused by strict injunctions to all the owners of flocks, not to sell any shawl-wool except to the Cashmerians or their agents, in consequence of a representation having been made to the Government, that the Jouaree merchants had bought some last year, and that the Cashmerians would suffer if any of this kind of wool were to pass into other hands." —*Moorcroft's Journey to Lake Manosarouara*— *Asiatic Res.* vol. lxii. In the year 1819, considerable advantage was anticipated from importing this wool into England; as a gentleman who was consulted, and who professed to have a practical knowledge of the English Wool Market, valued it at eight shillings per pound. The Byragee Wool, however, when imported was found to be unsaleable; as of 189 bales of Shawl and Bhyragee Wool, imported in the years 1821, 1822, and 1823, costing exclusive of freight and charges, £5,444, the gross sale proceeds amounted only to £809. This Wool was bought from the Hooneas, who keep sheep with the Shawl Wool Goats, by the people of Kunawur, and brought by them to Rampore, the capital of Bissehur, on the Sutlej. Specimens of the same kind of Wool, procured by Mr. Hodgson from the Booteas who visit Nepal, were forwarded to the Court of Directors of the East India Company, in 1835, by Dr. Wallich. Of this the sorted Wool was valued in London, at from 10*d.* to 11*d.* per pound; some in the unsorted state at 5*d.* to 7*d.*; and some was sold in the London market in 1834, at from 2*d.* to 7*d.* per pound; the low price was chiefly owing to its dirty and mixed state. Attention was turned in England to the subject of Indian Wool, by Mr. Southey, of Coleman Street, addressing a letter, 24th November 1836, to the Committee of Agriculture of the Royal Asiatic Society, respecting some Wool imported from Bombay. He suggested more attention being paid to the assortment of the Wool, and improvement in the breed of the sheep; and stated that last year there were imported into London 773 bags, and into Liverpool 624 bags of Indian Wool which were sold by Public Auction at 4½*d* to 1*s.* 2½*d.* per pound. The Wool was chiefly white but with black hairs occasionally interspersed; and he understood that it was produced in the province of Guzerat. In the following year, Mr. Southey again called attention to the subject, stating that the quantity exported from Bombay had enormously increased; but that what came to England was entirely of middling and secondary quality, and had, consequently, realized no higher prices than from 4½*d.* to 11½*d.* per pound. The great and rapid increase of the exports of Wool from Bombay is evident from an inspection of the following extract from the official Report of the Commerce of Bombay, for 1836-37.

"In the official year ending 30th April.

1834	69,944 lbs.
1835	486,528
1836	1.196,664
1837	2,444,019."

The report of 1837-38, goes on to say, "The quantity of Wool exported has increased from 2,444,019 lbs. to 2,700,086 lbs., valued at 98,564 rupees."

Sir A Burnes writing on wools of Cabool and Bokhara, says—1. The wool of Toorkistan, is obtained chiefly in the neighbourhood of Bokhara and Samarcand, and is more celebrated than that of Cabool. This is sent to Umritsir in the Punjab, where it is used to mix with the Shawl Wool of Tibet, in making what are called Cashmere shawls. It is the produce of the Goat of Bokhara and not of the Sheep of Toorkistan, and is called *put*, in contradistinction to *pushm*, which is used to express the fleece of the Sheep. 2. The wool or Put of the Goat of Cabool is not at present exported being entirely consumed in the Native Manufactures. It is procured from Goats, and chiefly from the Hill Country of the Huzaras to the West of Cabool, and between that city and Herat, which has an elevation of about 6,000 or 8,000 feet above the level of the sea. 3. The countless flocks of flat-tailed Sheep in Cabool, produce an abundance of Wool. The fleece is of a glossy white colour, and is in Cabool called *pushmi burra*, and the fabrics prepared from it *burrak*, in contradistinction to *puttoo*. It sells at from two and a half to two

Cabool Rupees the seer, or sixteen pounds. It is brought in from all directions for sale in Cabool, and Sir A. Burnes states that he “can scarcely put a limit to the supply, since the extent of pasture land in these countries is not over-rated at four-fifths of the whole surface of the country, and a very large portion of the population, such as the Lohanees and Ghilgees, are shepherds, who remove from pasture to pasture, and rear their flocks with great care and attention. Nature, however, does as much as the people; for aromatic plants, in which sheep delight, are exceedingly abundant, and it is universally believed that they have considerable effect on the quality of the Wool.”

Good Ewes appear to be obtained in Coimbatore and Baramahal; but Jalna and Beder are mentioned as the best places whence to obtain the white-wooled breed. The results obtained both at Bangalore and on the Neilgherry Hills, from crossing the white-wooled sheep of the country, with Saxon, Merino and South-down rams, are stated to be most satisfactory, both as to quantity and quality of Wool, and size of carcase.—*Royle's Productive Resources of India.* At the Madras of Exhibition of 1855, of specimens of Woollen Manufactures, the most remarkable were those from Hoonsoor, comprising white and colored blankets of various textures made in the Native loom, some being imitations of English Articles, and a decided improvement upon the country cumbly, and cheap in price. Among them was the description of blanket furnished to Invalids and time-expired men proceeding to England. These are not manufactured for the European Troops, being too thick, heavy and unsuited to the climate. English blankets are therefore provided instead; the comparative cost is as follows:

1	Hoonsoor	Blanket.		...	1	12	0
1	Europe	do.	red	...	4	8	0
1	Do.	do.	white		5	8	0

The Jury considered this manufacture worthy of encouragement, and observed that means should be devised to improve the Manufacture especially as wool is abundant. The description of wool from which these were manufactured is of recent introduction. In the Mysore country “Sheep thrive well, but the wool is coarse, and little used except for the manufacture of Native Blankets. About 10 years ago, General Cubbon took charge of a flock from the Madras Government, which had been collected the year previously for the purpose of introducing Merino wool into the country; but that flock was useless, it having been attacked with rot. He then collected one at a farm about 60 Miles West of Bangalore, and imported 3 or four Rams annually from Sydney, these amalgamate so well with the country sheep, both in figure and size, that in the 4th cross it is not possible to distinguish farm bred from the imported Ram. There are now about 6000 sheep in Mysore, with merino blood in them. Rams from the farm have been distributed to the Collectorates of North Arcot, Bellary, Salem and Coimbatore. During last year 25 Rams were sent to the Punjaub, by order of the Government of India. The wool has been very highly reported on by Messrs. Southey and son, and several parcels have been sold in London as high as 1 shilling and 6 pence per lb. while the country wool, and that imported from Bombay, averages only 4*d.* to 5*d.* per lb, There can be no doubt that when the Merino sheep is naturalized, wool will become a valuable article of Export. A mercantile firm in Bangalore, has recently exported the wool of the Mysore country to England, in considerable quantity, and has realized a very fair profit. Eventually the Merino will be produced as cheaply as ordinary wool.” The quantity and value of wool annually exported from Madras is lb. 1,28,413, value Rupees 15,816. A very large black cumbly from Kurnool was considered an excellent specimen closely woven, fine and soft in texture, and to this the Jury awarded, as the best specimen of the ordinary woollen manufactures of the country, a second Class Medal. A check Cumbly, from Chittledroog, was found deserving of honorable mention. The best specimen of woollens was found in the Tariff, being a blanket made of corded wool of excellent quality and reasonable in price. A red cumbly of Mysore, was exhibited in this collection and was of good quality. (Sd. W. E. Underwood, *Reporter.*)

At the great Exhibition of 1851, some fine merino wool was exhibited from the tableland of Mysore, and indigenous wools from the hilly country of the north-west frontier. Some from Lahore, and other kinds from the dry and cold elevated climate of Tibet. Of the last, were some very fine specimens from Lieut. Strachy. Many of the animals there being furnished with a fine down or hair-like wool under the coarse common outer wool. It is this which is chiefly employed for the shawls and the shawlwool cloth. Though woollen fabrics of superior quality are not likely to be fabricated in a hot country like India, yet as there are great diversities of climate in the different parts of Eastern and Southern Asia, some very substantial woollen cloths and blankets are made in different parts, amongst others, fine shawl-wool cloth in Cashmere; also the kind called Puttoo; a fabric, named *Pureepuz*, the pile of which, on one side, is formed of loops. Felted blankets and cloaks have been manufacted from the table land of Mysore, as well as from the north-west frontier, and from Nepal and Tibet.—*Royle, Arts &c. of India, page* 498.

China. The only woollen fabrics produced by the Chinese are felts for the soles of shoes and winter hats, and a sort of rag or carpet. It is not woven in looms from the yarn, but is made in small pieces by a fulling process which mats the fibres together. The consumption of it by shoe-makers is very great, and nearly as large for winter hats among the common people. The rags are woven with colored threads in rude imitation of figures, and are extensively used in the northern provinces; the pieces are a few feet square, and sown together for carpets or bedding. Hair and wool are both employed in their construction. The art of knitting is unknown, and of course also the fancy designs and worsted work which are made by ladies in the west.—*Williams' Middle Kingdom, Vol.* II *page* 126.

(8723) WOTAY KOROSHANUM.

Wotay Koroshenam, Tam. | Wontay Koroshnam, Tel.

This is a bright yellow, biliary concretion, found in the gall bladder of certain camels. It is highly prized as a beautiful yellow paint, but is very expensive.—*Ainslie.*

(8724) WOOTZ or INDIAN STEEL. The ore from which it is made is the magnetic oxide which is combined with quartz, generally in the proportion of 48 parts of quartz to 52 of oxide of iron. It is found in many parts of the south of India, but Salem is the chief seat of the manufacture, and there the ore is prepared by stamping and separating the quartz either by washing or winnowing. The furnace in which the ore is smelted is from three to five feet high from the surface of the ground, and the ground is hollowed out beneath it to the depth of eight inches or a foot. It is somewhat pear shaped, being about two feet diameter at the ground and tapering to about one foot diameter at the top: it is built entirely of clay, two men can finish one in a few hours, it is fit for use the next day; the blast is furnished by a pair of bellows each being a goat skin with a bamboo nozzle: a semi-circular opening about a foot and a half high and a foot in diameter at the bottom is left in the furnace and before each smelting it is filled up with clay: the furnace is then filled up with charcoal, and kindled, a small quantity of ore, previously moistened to prevent its receiving the charcoal, is laid on the top of the fuel, and charcoal is thrown over it to fill up the furnace: in this manner ore and fuel are added and the bellows plied for four hours or thereabouts when the process is stopped, and the temporary wall in front of the furnace having been broken down the bloom is removed by a pair of tongs from the bottom of the furnace and is then beaten with a wooden mallet to separate as much of the vitrified oxide as possible: and, while still red hot, it is cut through with a hatchet and in this state sold to the blacksmiths who perform all the subsequent operations of forging it into bars, and making it into steel. The process of forging into bars is performed by sinking the blooms in a small charcoal furnace and repeated heatings and hammerings to free it as much as possible from the vitrified and unreduced oxide of iron: it is thus formed into bars about a foot long, an inch and a half broad and about half an inch thick. In this state it is full of and exceedingly red short. These bars are cut into small pieces to enable them to pack in a crucible. A quantity amounting to a pound and a half to two pounds is put into a crucible along with a tenth part by weight of dried wood of the Cassia auriculata chopped small; these are covered with one or two green leaves of the calotropis (asclepias) gigantia or cow obulas laurifolius and the mouth of the crucible filled up with a handful of tempered clay which is rammed so as to exclude the air perfectly. As soon as the clay is dry twenty to twenty four of the crucibles are built up in form of an arch with their bottoms inwards, in a small furnace urged by two goat skin bellows, charcoal is heaped up over them, and the blast kept up without intermission for about two hours and a half when it is stopped and the process is considered complete. The crucibles are removed from the furnace and allowed to cool, they are then broken and the steel which has been left to solidify is taken out in a cake having the form of the bottom of the crucible. When the fusion has been perfect the top of the cake is covered with striæ, radiating from the centre but without any holes or rough projections on it: When the fusion has been less perfect the surface of the cake has a honey-combed appearance, caused probably by particles of scoriæ and unreduced oxide in the bar iron, and often contains projecting lumps of iron still in the malleable state. The natives prepare these cakes of steel for being drawn into bars by annealing them for several hours in a charcoal fire actuated by bellows, the current of air from which is made to play upon the cakes whilst turned over before it at a heat just short of that sufficient to melt them, by this means the excess of carbon is detached (*Mad. Lit. Journ*) The process of smelting iron differs according to circumstances in different parts. In some, the ore is collected in the form of sand from the beds of rivers; the iron stone is collected either from the surface or from mines.—*Rohde, M.S.S.*

(8725) WORMWOOD, INDIAN. Absinthium Wood.

Afsunteen Arab.
Gundmar, Cash.
Wael-kolundoo, Cyng.
Dhowna, Mustaroo, Murwa, Guz, Hind.

Domolo, Jav.
Dona, Sans.
Buranjasif kowhei, Pers.
Mashipattiri, Tam.

A perennial herb (*Artemisia Absinthium*) indigenous to Britain, celebrated for its intensely bitter tonic, and stimulating qualities. The wormwood met with in the bazars in India, is chiefly the produce of Persia, whence it is largely imported into Bombay by way of the Persian Gulf.—*Faulkner.*

(8726) WRIGHTIA, a genus of plants belonging to the natural order *Apocynaceæ*, named after Dr. William Wright. It has a 5-parted calyx, a salver-shaped corolla with the throat crowned by ten divided scales; the stamens exserted, attached to the throat of the corolla, and the anthers sagittal, cohering by their middle to the stigma; the ovaries two, cohering; the style single, filiform, dilated at top; scales five to ten in number, seated at the base of the calyx outside the corolla: the follicles distinct or combined with adnate placentas. Dr. Wight gives Wrightia coccinea, 442; *piscidia*, 472; Rothii, 1319; tinctoria, 444; Tomentosa, 443; Wallichii, 1296.

(8727) WRIGHTIA COCCINEA. Apocynaceæ. A large tree; flowers externally green, internally deep orange red, having something of the perfume of the pine-apple.—*Riddell.*

(8728) WRIGHTIA MOLLISSIMA. Introduced from the Naggary Hills; the yellow juice might be turned to account, but the timber is of no value.—*M. E. J. R.*

(8729) WRIGHTIA ANTIDYSENTERICA. Nerium antidysentericum. Echites antidys: Roxb

Veppaula, Tam.
Pala chettoo Tel.
Inderjan, Hind.

Found in the hill jungles of Kotah and Mewar, and a small tree of common occurrence in Mysore and the hilly parts. A native of the coast of Malabar, of Ceylon, and the Isle of France, and common in many parts of India. Tiwaj and Lisan ul-asafeer, *Arab.* Andnraroon, *Greek.* Seeds called *Indurjuo-i-shereen*, or the mild, to distinguish them from seeds of *Holarrhena pubescens*, and *Antidysenterica*, called *Indurjuo-i-tulkh*, or the bitter. A small shrub, leaves ovate oblong, or exactly oblong, shortly acuminate, smooth, bright green on each side.

The bark (*conessi bark*) is astringent and bitter, and also deemed febrifuge. The seeds, *Indurjuo*, are intensely bitter and used as a vermifuge,

Conessí bark has been given with much alleged advantage in chronic dysentery. The infusion seems the best form, 4 drachms of the dried and powdered bark being infused in 8 ounces of hot water for an hour:—dose one ounce thrice daily.—*O'Shaughnessy, p.* 445. Its medicinal virtues are worthy of attention, but the wood is of little value. The bark was formerly in request under the name of *Conessi* and is still esteemed a valuable drug by the natives. It appears to have lost its value in commerce, from not being distinguished from the bark of Wrighia tinctoria which grows in the same places. —*M. E. J. R.*

The Wood.

Palavaranee or palay wood, Eng.
Palava renoo, Tel.
Doodheci ke lakree, Hind.
Veppallay, Tam.

The tree has sweet-scented flowers with a form resembling those of the Jasmine. The wood is white, of a fine grain, and susceptible of polish, and is used by the turner and cabinet-maker. The bark of this shrub, which goes by the name of Conessi bark in Great Britain, and Palapatta in India, is asserted to be specific in dysentery and of use in most disordered states of the bowels. Its milky juice is also used as a vulnerary.—*Eng Cyc.*

The Bark.

Conessie, Fr.
Curayia, Curaija, Guz. Hind.
Palapatta, Maleal.
Codaga pala, Mal-
Corte-de-pala, Port.
Cheeree, Kutaja. Sans.
Veppalei, Tam.
Pala codija. Manoopala, Tel.

Conessi bark is the produce of a plant belonging to the natural order *Apocynaceæ*, a native of the Westein coast of Hindustan. It is the *Wrightia* (Nerium) *antidysenterica*, and is a valuable astringent.—*Engl. Cyc. page* 122. Mr. Faulkner describes it as a native of Ceylon, Mauritius, the Malabar Coast, and many other parts of India. It is astringent and bitter, and is considered febrifuge; it has also been given with alleged advantage in chronic dysentery. The seed of the plant are termed *Indrojow.* —*Faulkner.*

The Seed.

Lisau ul assafeer. Arab.
Indrajow, Guz. Hind.
Ahir, Pers.
Indrayava, Sans.
Veppalei arisee, Tam.

The seed of Wrightia antidysenterica (*Nerium antidysentericum*), are covered with a kind of downy tuft, somewhat resembling the down of the thistle Two kinds of Indurjuo seeds are distinguished, the *sweet* and *bitter*. The former, *Wrightia*, has a pleasant taste not unlike that of oats, which they also resemble somewhat in appearance; but are longer and more slender. An infusion of this roasted seed is given as a safe and gentle restrainer in bowel complaints; the decoction is employed in fever cases. The latter, *Holarrhena*, are intensely bitter, and used as a vermifuge.—*Faulkner.*

According to the Ind. Ann. Med. Sci. for Apl. 1856, p. 397. The bark of this tree, which was once introduced in the London Ph. as Conessi bark and was greatly lauded more than a century ago by Geoffroy, known also as Codaga and as Koorchee has long been a popular remedy on the Malabar and Coromandel Coasts, and also in Bengal in dysentery, and from a somewhat extensive trial which was made of it in that disease, of which it is hoped to be able to publish the results, it appears to be a remedy of no mean value. It has however been also known on the Malabar Coast and among the Portuguese there as a febrifuge, under the name of corte de palla. Dr. Cleghorn informs that several Medical officers in the Northern Circars have been administering it of late. We have no knowledge of its febrifuge virtues, but it seems to have fallen into disuse from carelessness in selecting the bark, and it may deserve a further trial. An infusion of the seeds called indrijau has been called febrifuge but is only demulcent. The most common and convenient way of administering koorchee is to give 1½ to 2 oz. of decoction three times daily.

(8730) WRIGHTIA TINCTORIA. Apocynaceæ, Icon. 444.

Pallay marum, TAM.	Kala Kooda, HIND.

A small tree with pale green soft leaves; deciduous in the cold weather. On being bruised, a kind of Indigo exudes from them. Flowers in March and April; white follicles in pairs, from twelve to eighteen inches long, which as they ripen the ends of each pair curiously join. The wood is used by turners and cabinet-makers.—*Riddell.* It is a common tree in the Coimbatore jungles, where it attains a considerable size, wood white and close-grained; in the words of Roxb. "coming nearer to ivory than any I know." It is not however much in use here.—*Wight.*

(8731) WRIGHTIA WALLICHII, Wight states, is found on "the slope of the Neilgherries from about the middle of the ascent to the elevation of between 4000 and 5000 feet;" but "the original specimens of this species were collected in the Tenasserim provinces."—*Mason.*

X.

(8732) XANTHOXYLACEÆ, *Xanthoxyls*, a natural order of Exogenous Plants. The flowers are unisexual and regular; the calyx in three, four, or five divisions; the petals usually of the same number as the divisions of the calyx, usually longer than the calyx, and sometimes absent: the æstivation is generally twisted and convolute; the stamens are equal in number to the petals, or twice the number, and arise from around the base of the stalk of the abortive carpels; in the female flowers they are either absent or very imperfect; the ovary is made up of the same number of carpels as there are petals, or of a smaller number; the carpels are either distinct or more or less combined; there are mostly two ovules in each cell, sometimes four: the styles are more or less combined, according to the cohesion of the carpels; the fruit is either membranous or in the form of a berry, sometimes having from 2 to 5 cells, and sometimes consisting of several drupes or 2-valved capsules, of which the sarcocarp is fleshy, and is easily separated from the endocarp; the seeds are solitary or twin, peduncles usually smooth and shining with a testaceous integument; the embryo lies in the midst of a fleshy albumen, radicle superior, and the cotyledons ovate or flat. The species of plants belonging to this order are trees or shrubs, with exstipulate, alternate, or opposite leaves furnished with pellucid dots. The flowers are either axillary or terminal, and coloured gray, green, or pink. The plants in this order were included originally by Jussieu in his *Terebinaceæ.* They were first separated by Martius and Nees under the *Xanthoxylaceæ*, which was subsequently adopted by Adrien de Jussieu. The species of *Xanthoxylaceæ* are found chiefly in America, especially in the tropical parts. A few of the species are found in Africa, in Mauritius and Madagascar, in India and China. One only is a native of Australia. All this order, to a greater or less extent, possess aromatic and pungent properties. The species which are best known and used on account of these properties belong to the genera *Xanthoxylum*, *Brucea Ptelea*, *Toddalia* and *Ailanthus.* The species of *Ailanthus* are large trees, and their timber is used for various purposes in the countries in which they grow. *A. glandulosa* is a native of China and the Moluccas, where it is called Ailanto. It attains a height of 60 feet. When the bark is wounded it gives out a resinous juice which hardens in a few days. The wood is hard and heavy, and is susceptible of a very fine polish. It grows well in England. *A. Malabarica* is a large tree, a native of Malabar. The wood is used for making sheaths for spears, &c. A resinous juice flows from the bark when wounded. The fruit is triturated with maize and mixed with rice in decoction, and used as an application in ophthalmia.—*Eng. Cyc.* The Cosmetic Wood of Mergui is from one of the *Xanthoxylaceæ* and is a fragrant cosmetic wood sold in the bazar, which is said to come from Mergui, but Mr. Mason never saw the tree.—*Mason.*

(8733) XANTHOCHYMUS, a genus of Plants belonging to the natural order *Guttiferæ.* Of these the *X. pictorius* is the most important. This plant is the *X. tinctorius* of Linnæus. It has lanceolate acuminate leaves, wrinkled petioles, and fruit 1-4-seeded. It is a native of the East Indies, in valleys among the Circar Mountains.—*Eng. Cyc.*

(8734) XANTHOCHYMUS PICTORIUS.

Eeswara mamede, CYNG.	Dampel, TEL. Rata, GHORKA.

A beautiful tree of the Mountainous districts of India, yields a green fruit and a large quantity of indifferent gamboge.—*Rohde, M. S. S*

(8735) XANTHOCHYMUS. YELLOW MANGOSTEEN. Roxb.

Malay Chucan pullum, TAM,	Bryonia SPEC,
Pedda Boodamanapundoo, TEL.	Geeri Gotoomba, SANS. Malay Poollie pullum, TAM.

Ainslie says he met with this fruit at Quilon where he was told that it was brought from the distant woods. It is in appearance like a Mango, but flatter and two or three large seeds (or stones) are contained in each, somewhat resembling jack stones. The fruit itself has an acid but pleasant taste and when cut, there exudes a yellow juice like liquid Gamboge. It appeared to be very little known to the European inhabitants of Travancore. They have on the Malabar coast a variety of the real Mangosteen (Garcinia Mangosteena); it is however very inferior to that of the Eastern islands and affords a yellow gum-resin, which is not soluble in water.—*Ainslie, page* 227.

(8736) XANTHOXYLON ALATUM. (Roxb. El. Ind. 768.)

Durmur Hind.

A native of Nipal, and the hilly countries north of Bengal, Rohilcund, and Oude, flowering in Calcutta in the hot and rainy seasons. Roxburgh states that every part of the plant possesses a peculiar aromatic pungency, and that the seeds are used medicinally by the natives.

(8737) XANTHOXYLON AVICENNÆ, (*Fagura A.*) a native of China, is a powerful stimulant, and used as an antidote against poisons.

(8738) XANTHOXYLON BUDRUNGA.

Toung-than; also Young-thanjee, Burm.

Is a native of the East Indies, in Silhet, and is called Budrung; and the natives use the seeds, which have a warm spicy flavour, medicinally. The fruit is about the size of a pea, and the outer coat contains an exceedingly fragrant balsam.—*Eng. Cyc.* It is a small thorny tree, the dry capsules of which are found in the bazars of India, under the name of Kek-ka-la. The seed abounds in a rich aromatic oil. The bark and large thorns of the trunk are the Tejbul of India. The tree is about twenty feet high in the Pegu and Southern parts of the Tounghoo districts, where it grows upon the banks of streams. —*McClelland.* This plant, found in the Pegu and Southern parts of the Tounghoo districts, affords a plentiful supply of oil-seeds, which has not, as yet, he believes, been taken advantage of as it deserves.—*McClelland.*

(8739) XANTHOXYLON HOSTILE. Xanthoxylum aromaticum, is a tree found in the Himalayas and in the mountains of Cashmere. Its branches are as thick as a finger, serve the natives as tooth-brushes; thicker branches are used by the faqueers as walking sticks, also to triturate the hemp plant, in preparing their beverage. In using a triturator possessing pepper like aromatic qualities, they save the pepper which is usually added to the hemp plant. The capsules and seeds are employed for intoxicating fish, and are chewed as a remedy in toothache (Royle). Besides the seeds, Honigberger used the bark, together with the sharp prickles which are attached to it by large bases.—*Thirty five years in the East by Honig. page* 365. The capsules and seeds of X. hostile, called Tejbul by the natives, are used in India for intoxicating fish and are supposed to be the Faghureh of Avicenna.—*Eng. Cyc.*

(8740) XANTHOXYLON PIPERITUM. In Japan the capsules of X. piperitum are used as a substitute for pepper. The fruits of many of the species are also held to be antidotes to the action of poisons on the system, and there can be little doubt that the secretions of these plants would be found valuable stimulant remedies in many diseases.—*English Cyclopædia, page* 1263. *Xanthoxylon piperitum,* is a powerful aromatic, used by the Chinese in the room of ginger and pepper. The active principle resides chiefly in the fresh leaves, the dry bark, and the pericarp. The physicians of the country apply a poultice made of the bruised leaves and rice flour in sore throats. For the preceding details Dr. O'Shaughnessy was indebted to Lindley's Flora Medica, p 215. Royle further informs us, p. 157, that in India *X. Budrunga, Rhetza alatum,* and *hostile,* are used wherever indigenous for the warm, spicy, pepper-like pungency of their capsules, a property which is participated in by their bark and other parts. The capsules and seeds of X. hostile, called *tejbul* by the natives, are employed in Northern India for intoxicating fish, and chewed as a remedy in toothache. They are also described as the Faghureh of Avicenna.—*O'Sh., page* 642.

(8741) XANTHOXYLON RHETSA, is a native of the mountainous parts of the coast of the East Indies, and in the Tamul language is called Rhetza-Marm, which means Council-Tree, as it is under the branches of this tree that the hill people assemble to discuss all matters of public interest.—*Eng. Cyc. page* 1863.

(8742) XANTHOXYLON TRIPHYLLUM. A resin is obtained from this tree. Judging from the specimens it appears to be produced in too small quantities to be useful in a commercial point of view.

(8743) XIMENIA ÆGYPTIACA.

Hingen; Hingot Hind.

Grows in the Kotah district: the nut shell is used to make crackers in fireworks.—*Gen. Med. Top. p.* 109. Wight gives *Ximenia olacioides,* 1861.

(8744) XYLOBALSAM. An inferior quality of opobalsam, obtained from the fruit and twigs of the (*Amyris Gileadensis*), that yields the superior quality.—*Faulkner.*

(8745) XYLCOCARPUS (from ξύλον, wood, and καρπός, fruit), a genus of plants belonging to the natural order *Meliaceæ.* The genus, with *Persoonia,* has been referred by Aublet and other botanists to the genus *Carapa.*—*Eng. Cyc.*

(8746) XYLOCARPUS GRANATUM: Carapa moluccensis, (Lamarck). Roxb. Flora Ind. ii. 240 *Beng.* Pussoor—a native of the Sunderbuns. Fruit ripens in June and July.

The Carapa of Guiana was first described by Aublet. It yields fruits, the almonds of which are white, solid, oily, and bitter. The oil he described as being used by the Galebi savages to anoint their skins and hair, in order to keep off insects. Rumphius described a similar but smaller tree in the Moluccas, under the name of "Madahul," or "*Granatum litoreum.*" This Willdenow described as Xylocarpus granatum. The Xylocarpus is mentioned as a tree with elegantly veined wood, used in India in cabinet work, and its bitter root being employed in bilious fevers. A starchy substance, used as an article of food, is also found beneath the bark of the capsule.—*O' Shaughnessy, page* 246. This the sea-cocoanut of Tenasserim, *Xylocarpus Granatum*, is not the famous *Cocos des mer* of the Seychelles, so long the wonder of the world; but a tree very common in the mangrove swamps; and growing near the shore, its fruit falls into the water and floats out upon the sea, which gives rise to its name. The fruit is not edible, but is exceedingly astringent, and regarded by the natives as a specific in cholera. —*Mason.*

(8747) XYLOPHYLLA ANGUSTIFOLIA, EUPHORBIACEÆ. This is a small shrub growing to the height of three feet, the color of the flowers is yellow and red.—*Riddell.*

(8748) XYRIDACEÆ, *Xyrids*, a natural order of Endogenous Plants. The species are herbaceous plants with fibrous roots. The leaves are radical, sword-shaped, scarious, dilated and equitant at the base. The flowers are arranged in terminal naked imbricated heads; the calyx is glumaceous, 3-leaved; the corolla petaloid, coloured, with 3 petals; the stamens 6; 3 fertile, inserted upon the claws of the petals; 3 sterile, alternate with the petals; the anthers 2 celled, and turned outwards; the ovary single, the style bifid; the stigmas multified or undivided; the capsule 1-celled, 3-valved, many-seeded, with parietal placentæ; the seed with the embryo on the outside of the albumen, and at the end most remote from the hilum. As at present constituted, this order comprises only the genera *Xyris Abolboda.* The species of these genera are found generally in the hotter parts of the world, chiefly in the tropics of America, Asia, and Africa. Some of the species of *Xyris* are found in the southern states of North America. *X. Indica* is said by Agardh to be used as a remedy in itch and leprosy.

(8749) XYRIS INDICA. A species of Xyris with conspicuous yellow flowers on imbricated scaly heads, is often seen in the Tenasserim paddy fields.—*Mason.*

Y.

(8750) YAK. The yak is a very tame domestic animal, often handsome and a true bison in appearance. It is invaluable to the mountaineers of Northern India, from its strength and hardiness, accomplishing at a slow pace, 20 miles a day, bearing either two bags of salt or rice, or four to six planks of pine wood slung in pairs along either flank. Their ears are generally pierced and ornamented with a tuft of scarlet worsted; they have large and beautiful eyes, long silky black hair, and bushy tails: black is their prevailing colour, but red, dun, party coloured and white are common. In winter, the flocks graze below 8000 feet, on account of the great quantity of snow above that height; in summer they find pasturage as high as 17,000 feet consisting of grass and small tufted carices, on which they browse with avidity. Much of the wealth of the people in East Nepal consists in its rich milk curd, eaten either fresh or dried, or powdered into a kind of meal. The hair is spun into ropes, and woven into a covering for their tents, which is quite pervious to wind and rain, though in the dry climate of Tibet this is of little consequence. The bushy tail forms the well known chowree or fly flapper of the plains of India, and its hair is greatly esteemed by the women of the plains to add to their back hair. The female drops one calf in April, and the young yaks are very full of gambols, tearing up and down the steep grassy and rocky slopes. Their flesh is delicious, much richer and more juicy than common meat, that of the older yaks is sliced and dried in the sun, to form jerked meat, called schat-t-chew dried meat, which is eaten raw, and is a palatable food. The yak loves steep places delighting to scramble among rocks, and to sun its black hide perched on the glacial boulders which strew the Wallanchoo flat, and on which these animals always sleep. Their average value is from two to three pounds. The yak though indifferent to ice and snow, cannot endure hunger so long as the sheep. Neither can it bear damp heat. The yak is ridden and its pace is easy. The wild yak or bison (D'hong) of Central Asia, the superb progenitor of the domestic yak is the largest native animal of Tibet, in various parts of which country it is found. It is untameable and horridly fierce, falling on the hunter with horns and chest, and if he rasps with his tongue it is so rough as to scrape the flesh from the bones. It is hunted by large dogs, and shot with a blunderbuss, the horn is used as a drinking cup in marriage feasts and other grand occasions.—*Hook. Him. Jour. Vol.* 1 *p.* 215.

(8751) YAMANEE. There is a tree on the hills of Tenasserim which furnishes a remarkably light, white timber, resembling mootchee wood, of which the natives often make canoes. The Karens say it bears a yellow flower, and a small plum, which is a favorite food with the barking deer.—*Mason.*

(8752) YAMS. The different species of yams have a wide range. In the West Indies there are several varieties, having distinctive names, according to quality, color, &c., as the white yam, the red yam, the negro yam, the creole yam, the afoo yam, the buck yam, (*Dioscorea triphylla*), which is found wild in Java and the East; the Guinea yam, the Portuguese yam, the water yam, and the Indian yam, &c. The last is considered the most farinaceous and delicate in its texture, resembling in size the potato; most of the other sorts are coarse, but still very nutritive and useful. The common yam (*Dioscorea sativa*) is indigenous to the Eastern Islands and West Indies. The Guinea yam *D. aculeata*, is a native of the East. The Barbadoes or winged yam (*D. alata ?*) has a widely extended range, being common to India, Java, Brazil. *Yams* of Western Africa. The yam species are climbing plants, with handsome foliage, of the simplest culture, which succeed well in any light, rich, or sandy soil, and are readily increased by dividing the tuberous roots. The Indian, Barbadoes, and red yams are planted in the West Indies early in May, and dug early in the January following. If not bruised, they will keep well packed in ashes, the first nine, and the second and last twelve months. The Portuguese and Guinea yams are planted early in January and dug in September. Creole yams and Tanias are dug in January. Sweet potatoes from January to March. In most of our colonies large crops of the finest descriptions of yams, cocos &c., could be obtained, but the planting of ground provisions is too much neglected by all classes. From the tubers of yams of all sorts, and particularly the buck yam, starch is easily prepared and of excellent quality, Some varieties of the buck yam are purple fleshed, often of a very deep tint, approaching to black, and although this is an objection, because it renders more washing necessary, yet even from these the starch is at last obtained perfectly white.

As an edible root the buck yam, especially when grown in a light soil, is equal to the potato, if not superior to it. It does not, however, keep for any length of time, and therefore could not be exported to Europe, unless the roots were sliced and dried. Yams and sweet potatoes thrive well in the northern parts of Australia; indeed the former are indigenous there, and constitute the chief article of vegetable food used by the natives. The yam was introduced into Sweden, where it succeeded well, and bread, starch and brandy, were made from it: but it prefers a warmer climate. Yams are occasionally brought to England. When cooked either by roasting or boiling, the root is even more nutritious than the potato, nor is it possessed of any unpalatable flavor, the peculiarity being between that of rice and the potato. Dressed in milk, or mashed, they are absolutely a delicacy, and from the abundance in which they are cultivated in the West Indies, and other parts, they promise to become a most economical and nutritious substitute for the potato. The yam frequently grows to the enormous size of forty or fifty pounds weight, but in this large state it is coarse flavored and fibrous. An acre of land is capable of producing 4½ tons of yams, and the same quantity of sweet potatoes, within the twelve months, or nine tons per acre for both, being nearly as much as the return obtained at home in the cultivation of potatoes; and we have the authority of all analytical chemists for saying that in point of value, as an article of food, the superiority is as two to one in favor of the tropical roots. The kidney rooted yam (D. pentaphylla), is indigenous to the Polynesian islands, and is sometimes cultivated for its roots. It is called Kawan in the Feejee islands. D. Bulbifera, a native of the East, is also abundantly naturalised in the Polynesian islands, but is not considered edible. There are seven or eight kinds of yams grown in India. Two found in the Tartar country are of a remarkable fine flavour, one weighing as much as eighteen pounds the other three pounds.—*Simmonds' Comml. Product*, *p.* 363 & 4. See Cocos or Eddoes, also Dioscorea.

(8753) YANG-TSE-KIANG RIVER. The rise and fall in the Yang-tse-Kiang averages about ten feet and vessels are obliged to find their way hap hazzard into the channel or perchance run upon one of the silted sands.—*American Expedition to Japan*, *p.* 166.

(8754) YARN. Twist.

Garen, Dut.
Fil, Fr.
Garn, Ger.
Soota, Guz. Hind.
Filato, It.
Fio, Port.
Prasha, Rus.
Hilo, Sp.

Wool, Cotton, Flax, &c. spun into thread. Its quality is expressed in English by numbers denoting the number of hanks in an avoirdupois lb. weight; reckoning the length of the hank of cotton yarn at 840 yards, or 7 leys of 120 yards each.—*Faulkner.*

(8755) YARVINEY, in Tamil and Crawn in Portuguese and Dutch. This Ceylon tree grows tall and straight, from twenty to forty-five feet high, and from twelve to thirty inches in diameter. It may be obtained in great quantities, and answers many purposes in ship and housework.—*Edye. Ceylon.*

(8756) YASHM. The Messrs. Schlagentweit found the quarries of this mineral at Gulbagashen in the valley of Kara kash, in their Journey from Ladak to Khotam.—*Mag. Survey* 1857.

(8757) YAVY.

Yavayloo, Tam. | Yeva Sans, Tel.

This grain grows in some of the more northern provinces, and has an appearance something like that of blighted wheat, it is not very valuable.—*Ainslie page* 220.

(8758) YEAST, Barm. A product of the fermentation by which beer is made ; upon the surface of which it swims from involving bubbles of carbonic acid gas. It may be obtained in the form of a firm paste. Mixed with moistened flour, it excites the panary fermentation, and is thus used for baking bread.—*Waterston.* The substance known as Yeast, is in reality a plant, belonging to the Tribe of Fungi in the state of sporules or thallus : or the true aerial tufts or heads of sporules, of a multitude of minute oval or circulating bodies or sporules, endowed, under certain favourable circumstances, with extraordinary powers of growth and multiplication. In Britain, three kinds, viz. brewer's yeast, German yeast, and patent yeast, are employed in the manufacture of bread ; In India, the yeast employed, is the fermented juice of the Palms, known as Toddy. The vitality of yeast is destroyed by falls, blows, bruises or rough mechanical injuries, as also—heat, cold, and chemical re-agents. The presence of yeast in a substance containing sugar, or starch convertible into sugar and nitrogenised matter, induces certain chemical changes comprehended under the term vinous or alcoholic fermentation. These changes in the making of bread consists in the conversion of sugar of flour into alcohol and carbonic acid gas ; the latter, in its efforts to escape from the dough with which it is mixed, distends it, forming vesicular spaces in its interior, and so causing it to become porous and light.

Yeast is found on the surface of fermenting liquids, and when removed capable of producing fermentation in other liquids susceptible of this action. On placing Yeast under the microscope it presents a number of cells immersed in a mass of amorphous matter. The cells are sometime single, and at other times several are united together in a kind of chain. These cells are supposed to partake of a fungoid character, and they have been called the Yeast-Fungus, or Ferment-Cells. A genus and species have been constituted for the reception of this organism, under the name of *Saccharomyces Cerevisæ.* This plant has been supposed to be the active cause of fermentation, and the carbonic acid given off during that process has been regarded as the result of the growth of the plant. This seems to be a misinterpretation of the phenomena, as the plant is probably the result of the carbonic acid given off during the process of fermentation rather than its cause. Schleiden supposes that these ferment-cells originate in liquids, independently of other cells, and are truly instances of the formation of cells in a free fluid. He observes however that they have no power of reproducing other cells. The whole subject of the nature of these cells, their mode of production, and the history of their development, as well as the phenomena of fermentation in general, require further elucidation. (Schleiden, *Principles of Scientific Botany*; *Micrographic Dictionary*, articles 'Fermentation,' 'Torula,' 'Yeast.'

(8759) YELLOW-HAMMER, the common name for the *Emberiza citrinella.* Linn. Pennant quotes the Bruant of Belon (L'Histoire de la Nature des Oyseaux,' p. 366) as this species, and the description seems to warrant the quotation. Belon considers the bird to be the Ανθος of Aristotle ('Hist. Anim,' ix. 1), and remarks that the Greeks of his time did not call it by the ancient appellation in their tongue, but by the Latin name *Florus*, "car ils ont este dominez par les Latins, dont ils ont retenu telle diction." It is the Bruant of the French generally ; Serramolle and Zivolo di Testa Gialla of the Italians : and, according to the 'Portraits d'Oyseaux,' Hortolano, Cia, Megliarina, Verzerot, Paierizo, and Spaiarda of the same people. It appears to be the Groning and Golspink of the Swedes ; Goldammer, Ammering, and Goldammering of the Germans ; Geel-Gerst of the Netherlanders ; Yoit, Yellow-Yoldrin, Yellow-Yowley, and Yellow-Yeldrock of the English : and Lilnos Felen of the Welsh. These birds are caught and fatted for the table with the Ortolan in Italy, whence probably one of the Italian names above noticed.

(8760) YELLOW-WOOD. There is a fine East India wood thus called, it appears to be larger and straighter than box wood, but not so close grained. I should think it would be found to be a valuable wood for the arts—*Halt.*

(8761) YEPY TREE. This name is applied in the Madras territories to two species of Bauhinia. *B : diphylla* and *B. Vahlii* the fibres of which are made into cordage : the *B. racemosa* "Malfhum" "Maljum" or "Maloo" grow in the hot valleys of the Himalayas, in the forests of the Sewalik Hills, from the doons of the North West to Assam. It is a magnificent climber and its product is known as "Patosa" or "bawal" fibre. *B Scandens,* grows not uncommon, about Gowhatti and common in Silhet : its fibre is equal in strength to that of Sunn Hemp and is made into cordage and cloth.

(8762) YEPY TREE BARK, Bauhinia Diphylla and B. Vahlii. These trees have a coarse brown bark of which the natives of India form a temporary rope for securing thatch, matting or fences. The Barks of several Bauhinias are used for similar purposes the Ara Nar is the bark of the B. parviflora, of which the matches of guns are made.

(8763) YEZAIEMAN, The most abundant supply and the best coal comes from Kinsin. I do not know how much there is in Nippow but there is none in Sikok.—*American Expedition to Japan, p.* 397.

(8764) YUCCA, a genus of Plants belonging to the section *Asparageæ*, of the natural order *Liliaceæ*. The corolla is inferior, bell-shaped, its segments without nectaries; stamens club-shaped; style none; berry hexagonal, of six cells; seeds numerous, flat. *Y. gloriosa*, Common Adam's-Needle, is a caulescent plant, with lanceolate straight furrowed leaves, their edges smooth and entire. This handsome plant is a native of Peru and North America. It grows on the shores of Caroline, where it blossoms in July and August its panicle of elegant flowers attaining a height of 10 or 12 feet. In British gardens the stem of this plant does not attain a height of more than 2 or 3 feet. *Y. aloifolia*, Aloe-Leaved Adam's-Needle, has linear-lanceolate even straight leaves, with the edges bordered by fine callous notches. This plant is a native of North and South America. *Y. draconis*, Drooping-Leaved Adam's-Needle, and *Y. filamentosa*, Thready Adam's-Needle, are cultivated in this country. The latter grows in the open air, and blossoms in the autumn. Its flowers are panicled and pendulous, and of a cream-colour. The leaves have their edges beset with long recurved threads.

(8765) YUCCA. Several species quite hardy They only require to be grown in places where water does not stagnate in winter; *Y. gloriosa*, *Y filamentosa*, *Y Draconis*, *Y. flaccida*, and *Y. superba*, are the handsomest species.

(8766) YUCCA GLORIOSA, OR ADAM'S NEEDLE. *Adam's Needle*, or *Yucca gloriosa*, like others, seems sometimes to be called an Aloe The species of *Yucca* are natives of the southern provinces of the United States, and being there exposed to extremes, are capable of living in the open air, both in Europe and India. They are conspicuous for their noble show of lily-like white flowers, as well as for their long sword-shaped leaves terminated by a thorny point They, no doubt, all abound in fibre, as some of a fine quality and strong in nature, has been sent from Madras, separated from the leaves of the *Yucca angustifolia*. Other species flourish as far north as in the Botanic garden at Saharunpore. The fibres also take colour, as in the specimens sent from Madras, dyed red, orange, purple, and green. Fibre has also been separated from other species of Yucca, as *Y. aloifolia* and *Y. filamentosa*. These are amongst those which have received the name of silk-grass. Those sent from India are from two to four feet in length, and are rather wiry, or resemble those of the Agave more than they do the fibres of Bromelia.

The fibre of *Yucca gloriosa*, is Adam's needle, a strong, fine but rather stiff fibre, suited for the manufacture of cordage, it very soon becomes discolored by steeping, but is not so liable to rot as some of the other fibres of this kind. Very good specimens were exhibited by Dr. Riddell, Dr. Kirkpatrick and Revd. P. Methuselah; the plant does not appear to be abundant in Southern India, but grows easily and might be propagated to a great extent.

(8767) YUCCA ALOEFOLIA, produces a white, pliant and strong fibre, resembling that of the Agave in all respects, but is apt to be discolored by steeping, which the Agave is not.—*Royle. Riddell. M. E. Juries' Report.* Dr. Hunter has proved that the so called Aloe Plants, yielding fibres, are of great value, for a bundle bore 160 lbs when a similar one of Petersburgh hemp broke with the same weight. The fibre is two feet long, white and of fine quality, and readily takes colours. It was made from the A. perfoliata, *Kalabuntha*, which Dr. Royle supposes to be the same as his A. indica.—*Juries Reports M. E.*

(8768) YUNX TORQUILLA. This is the Ἴυγξ of the Greeks. Aristotle has well described the bird, its long tongue, its power of protruding and retracting it, and the writhing snake-like motion which it can impart to its neck without moving the rest of the body. ('Hist. Anim,' ii. 12.) It has been made familiar to most literary readers by the adjuration in the second Idyll of Theocritus ('Pharmaceutria'). It is also the *Iynx* of the Romans. (Pliny, xl. 47) *Yunx* in the form used by Linnæus and zoologists generally, but it ought to be *Iunx*, or *Iynx*. The Wryneck is the Torcol of the French, and also the Tercou, Torcou, Turcot, Tercot, and Torcot of the same, according to Belon; Torcicollo, Collatorto, Stortacoll, Capetorto, Vertilla, and Formicula, of the Italians; Gjoktyta of the Swedes; Bende-Hals of Brunnich; Natterwindl, Wendhals, Wendehals, and Dre-Hals, of the Germans; Long-Tongue, Emmet-Hunter, Snake-Bird, Cuckoo's-Mate, Cuckoo-Maid, Cuckoo's-Maid, and Cuckoo-Fool (two last Gloucestershire) of the English; Gwas y Gog and Gwddfdro of the Welsh; Arizui of the Japanese.

The male has the ground-colour of the plumage of the upper parts rusty ash-colour, irregularly spotted and speckled with brown and black; a large brown streak extends from the occiput to between the scapulars; on the external barbs of the wing-feathers rusty squared spots; tail-feathers bounded with black zig-zags; throat and front of the neck pale rusty, with small transverse black lines; bill and feet olive-brown; irides hazel or yellow-brown. Total length 7 inches. It is found in Denmark, Sweden (May), Germany, Holland (where it is rare), France, Spain, and Italy (summer); England, and Wales, Scotland (rare in the last and in the north of the first—summer); Kamtschatka (Viellot), Japan, Himalaya Mountains. Winter residences, North Africa and warm parts of Western Asia.—*Eng. Cyc.*

Z.

(8769) ZAFFER. Zafre. An impure oxide of cobalt, prepared by calcining its ores, and mixing the product with about twice its weight of finely powdered flint. It is used for communicating a blue colour to glass, porcelain, and earthenware; and when roasted with potashes, washed, and pulverized, forms *smalts.* (*Waterston.*)—*Faulkner.*

(8770) ZALACCA. A genus of palms with an edible fruit occurring in Malacca, Penang, Assam, and the Tenasserim Provinces, this species is known as "Salac koombar" in Penang, and "Salac Batool" also "Rungun" in Malacca, Assam Koombar and Assam Paiah. The leaves employed as thatch and for baskets &c.—*Seeman.*

(8771) ZALACCA EDULIS. Edible zalacca Selung boat timber. A red scaly fruit produced by this species of zalacca may be often seen in bazar, but it is eaten by the natives only. The Selungs of the Mergui Archipelago shoot over their waters with remarkably light boats, and they owe their buoyancy to the materials that form their sides, which are the stems of the edible zalacca. These stems are as light, and of the consistency of cork, for which they are often substituted; and the Selungs are skilful in uniting them together to serve instead of planks, so as to make an unequalled sea boat, that floats on the waves like a swan.—*Mason.*

(8772) ZAMIA, a genus of Plants belonging to the natural order *Cycadaceæ.* The species of this genus are trees with a single cylindrical trunk, increasing by the development of a single terminal bud, and covered by the scaly bases of the leaves; the wood consists of concentric circles, the cellular zones between which are exceedingly loose, the ligneous tissue having the tubes marked by circular discs; the leaves are pinnated, not articulated, and have a gyrate vernation. The flowers are diœcious; the male flowers are arranged in tessellated catkins with abrupt scales, the anthers oval, sessile at the under side of each scale. The female flowers are in tessellated catkins, the scales peltate, drupes two at the under side of each scale. The species are found in the tropics of America and Asia, and also at the Cape of Good Hope and in Australia.—*Eng. Cyc.*

(8773) ZANONIA, a genus of Plants belonging to the natural order *Cucurbitaceæ,* named after James Zanoni. The only species belonging to this genus is *Z. Indica,* the Climbing Indian Cucumber. The fruit is described by Rheede as obscurely triangular, and having the flavour of the cucumber.—*Eng. Cyc.*

(8774) ZANTHOXYLEÆ, made up chiefly of genera placed by De Candolle in *Rutaceæ* and in *Terebinthaceæ,* are distinguished by their flowers being usually unisexual, by the calyx being free, petals hypogynous, equal in number to divisions of the calyx, ovaries subdistinct or united, each with two ovules, fruit indehiscent, carpids opening by a vertical suture, embryo in the axis of albumen. Many of the Zanthoxyleæ are remarkable for secreting a bitter principle, *Xanthopicrine,* and also a volatile oil of aromatic pungency. Thus several species of Zanthoxyleæ are employed as stimulants: one formed the *Faghureh* of Avicenna. Species of Ptelea and Toddalia are bitter and febrifuge. Both the species of Brucea are likewise bitter and tonic. *B. antidysenterica,* the Woginos of Bruce, is most celebrated, because it was long supposed to yield the Bark which was known as false Angustura, and from which the alkali *Brucia* was obtained; but the former is now well ascertained to be the bark of Strychnos Nux Vomica.—*Royle.*

(8775) ZANTHOXYLON RHETSA. Rutaceæ. A large tree armed with sharp prickles; capsules have a strong aromatic taste; the seeds are used instead of pepper.—*Riddell.*

(8776) ZAPORNIA, Leach, a genus of Birds belonging to the family *Rallidæ.* The beak is slender, shorter than the head, acuminated, compressed, acute; upper mandible gradually incurved; nostrils linear, lateral, placed at the base of the beak. Legs long, slender, cleft, with three toes in front; the hinder toe elevated from the ground at its base; the tibiæ half naked. (Gould.)—*Eng. Cyc.*

(8777) ZAPORNIA PORZANA, the Spotted Crake This is the Petit Rale d'Eau, Caouchouan, and Marouette of the French; Porcellana, Porzana, Grugnetto, Porciglione, and Gallinella, of the Italians; Punktiertes Rohrhuhn and Kleines Gesprenkeltes Wasserhuhn, of the Germans; Speckled Water-Hen and Skitty, of the English; and Dwfriar Faunog of the Welsh.

Adult and Old Male.—Forehead, eyebrows, and throat leaden-gray; sides of the head ash marked with black; upper parts olive-brown, but all the feathers black in the centre and variegated with small spots and stripes of pure white; breast and lower parts olive, shaded with ash and marked with white spots—these spots are rounded on the breast, but disposed on the sides in transverse bands; middle tail-feathers bordered with white; lower tail-coverts pure white; bill greenish-yellow, red at the base; feet greenish-yellow: iris brown. Length about 9 inches.

Adult Female.—Ash-colour of the throat and neck less extensive; sides of the head with brown spots; base of the bill with rather less red. It is found in Sweden (summer visitor, rare); Southern Russia; north of Germany and Holland (rare); France, Provence, and to the Mediterranean (more common). It is of most frequent occurrence in the south and east of Europe; it has been seen at Smyrna in the winter, and is stated to extend to India. It is a summer visitor in England, Scotland, and Wales, but is not common; and is occasionally found in Ireland in the summer.

The fine flavour of this bird is well known and appreciated in France. Few, if any, of the aquatic, or indeed of any tribe, can match it in autumn as a rich morsel for the table, especially if it be young. Colonel Hawker, speaking of the Common Water-Rail and this species, truly says, "Notwithstanding these two are seldom regarded by sportsmen, yet there is scarcely a greater delicacy than either the one or the other." Both are indeed first-rate, but the Spotted Crake for choice.—*Eng. Cyc.*

(8778) ZEA, a genus of Plants belonging to the natural order *Graminaceæ.* The name is identical with the Greek Ζειά, but the Greek plant was a species of *Triticum* or *Hordeum*, and not at all agreeing with the present genus, which is entirely American.

The plants belonging to this genus are monœcious. The male flowers are in distinct spikes; the calyx consists of a 2-flowered blunt glume; the corolla of a blunt glume. In the female flowers the calyx in a 2-valved glume; also the corolla; the style is single, filiform, pendulous; the seeds solitary, immersed in an oblong receptacle There are two species.—*Eng. Cyc.*

(8779) ZEA MAYS. Indian Corn, Lin.

Mukka Cholum, Tam.
Mukka Jooarie, Duk.
Mokka Zonaloo, Tel.
Bhoottah, Hind.
Jaggon, Malay.
Yavanala, Sans.
Mokka, Beng.

Zea mayz, Common Maize, or Indian Corn, is known by its entire leaves .It is a native of America, and is cultivated there, as in most countries of Southern Europe. Like the species of *Triticum*, those of this genus present almost innumerable varieties, from the cultivation to which they have been submitted. As an article of food the fruit is much inferior to that of the *Triticum*, nor will it ripen its fruit fully in high northern latitudes.—*Eng. Cyc.* A native of South America, Hindostan, &c. cultivated extensively in Europe. The uses of Indian corn for alimentary purposes are too well known to need description here. The flour makes an excellent cataplasm. The stalks of the plant contain a considerable quantity of sugar, which has been economically manufactured in the crystalline state in several of the South American provinces.—*O'Shaughnessy, page* 636. Maize, or Indian corn, is more generally grown than millet, and "green corn" is a common article in market, but it is hard and insipid, decidedly inferior to American corn.—*Mason.*

(8780) ZEDOARY.

Zerukbad, Arab.
Shoothee, Beng.
Hinhooroo-pecallieulla, Cyn.
Kutchoor, Dut.
Zedoaire, Fr.
Zittwer, Ger.
Capoor-cachery, Kakhur,
Guz. Hind.
Zedoaria, It.
Bengley, Jav.
Zerumbad, Pers.
Karchura, Sans.
Cedoaria, Sp.
Pulang-Kilungga,
Tam.
Keechlie-gudda, Tel.

The root of a plant which grows in Malabar, Ceylon, Cochin-China, &c. of which there are three distinct species. It is met with in pieces of various sizes, externally wrinkled, and of an ash colour, but internally of a brownish red. The odour of Zedoary is fragrant, and somewhat like that of camphor; the taste biting, aromatic, and bitterish, with some degree of acrimony. It was formerly employed in medicine, but is scarcely ever used by modern practitioners. (*Milburn's Oriental Commerce.*) Zedoary is imported into Bombay from China and the Malabar Coast; the former kind is preferred.—*Faulkner.* Mr. Colebroke applied this term to the roots of Curcuma Zedoaria, on account of the Persian and Arabic synonyms being Judwar and Zudwar. Clusius gives a plate of this Zedoary, the roots of which strikingly resemble those of A. atees. The Persians describe five kinds of Zedoary—Chinese, Nipalese, Tibetan, Dukunee, and Spanish. There can be little doubt but the Nirbisi is the true Zedoary of ancient writers, but its source is as yet unknown.—*O'Shaughnessy pages* 167-68.

(8781) ZEERA. Cuminum Cyminum, Cummin Seed; black and white. This is grown in beds the same as the coriander; the seeds are used for seasoning curries. Much is brought from China and the Persian Gulph.—*Riddell.* See Zira.

(8782) ZEOLITES, a family of Minerals, so named because the species generally melt and intumesce before the blowpipe, the term being derived from the Greek ζέω, to boil. They consist essentially of silica, alumina, and some alkali, with more or less water. The most of them gelatinise in acids, owing to the separation of the silica in a gelatinous state.

They occur filling cavities in rocks, constituting narrow seams, or implanted on the surface, and rarely in imbedded crystals; and never disseminated through the body of a rock, like crystals of garnet or tourmaline. All occur in amygdaloid, and some of them occasionally in granite or gneiss. *Heulandite*, *Laumonite*, *Apophyllite*, and *Stilbite* have a strong pearly cleavage, and do not occur in fine fibrous crystallisations; when columnar, the structure is thin lamellar. Excepting *Laumonite*, these species dissolve in the strong acids, but do not gelatinise. The species *Natrolite*, *Scolecite*, *Stellite*, and *Thomsonite*, are often fibrous, and the crystallisations generally slender. The remaining species, *Harmotome*, *Analcime*, *Sodalite*, *Hauyne*, *Lapis-Lazuli*, and *Chabazite*, occur in short or stout glassy crystals, and are seldom fibrous. Some of these minerals are described under their proper names.—*Eng. Cyc.*

8783) ZEPHYRANTHES TUBISPATHA.

In Tenasserim, one or two species of zephyranthes of the amarylis tribe which were introduced from Dr. Carey's garden at Serampore, grow very well, and form handsome border flowers.—*Mason*

(8784) ZEUS. Russel.

Carrameen, Tam.

A Fish, Palankeen Boys Fish.—*Ains. Mat. Med. page* 155.

(8785) ZIMB, an Insect translated Hornet in Scripture (Exodus, chap. xxiii., ver. 28; Deut. vii. 20; Joshua xxiv. 12). The Hebrew name is 'tzirah,' and probably expresses its loud buzzing noise The account which Bruce has given of the 'zimb,' or Dog-Fly, of Abyssinia, offers such striking analogies to the insect specifically termed 'tzirah,' and included in the more general term 'zebub' of the Hebrew Scriptures, that very little doubt exists regarding the identity of the two. It is difficult to conceive that Isaiah could have had in view any other insect when he says—"The Lord shall hiss for the fly that is in the uttermost part of the rivers of Egypt" (Isaiah vii, 18). The original word rendered 'fly' in our translation is 'zebub,' and, as Bruce observes, "The Chaldee version is content with calling this animal simply 'zebub,' which signifies the fly in general, as we express it in English. The Arabs call it 'zimb' in their translation, which has the same general signification. The Ethiopic translation calls it 'tsaltsalya,' which is the true name of the particular fly in Geer, and was the same in Hebrew." Bruce has given a graphic account of this fly, and there can be little doubt that this insect is related to the family of *Astridæ*.

The Latin *Asilus* and the Greek *οἶστρος* were probably only different pronunciations of the same term 'ha-tsirah,' as this fly is called both by Moses and Joshua. Mr. Bracy Clark, in the 9th volume of the 'Linnæan Transactions,' part ii., 1843, refers the fly alluded to by Moses (and said to "hiss and make a noise") to *Œstrus bovis*, and remarks on Bruce's figure, that it has no resemblance to the genus of flies the *Cuterebra*, but is rather, though with something fictitious about it, allied to the genus *Stomoxys*, or perhaps *Tabanus*, both of which genera are certainly silent flies in their attacks on cattle.

There can be no doubt that the *οἶστρος* was a perfectly distinct insect from any of the modern *Æstrid.* (Kirby and Spence, *Introduction to Entomology.*) *Eng. Cyc*,

(8786) ZINC. Zincum.

Tootanagum, Tam. | Sungbusrie. Duk.

Zinc. This metal, in commerce frequently called *Spelter*, was first mentioned by Paracelsus, in the 16th century, under the name of *Zinetum*. It does not occur in the native state, but is obtained from its ores, which are chiefly the Sulphuret and Carbonate of Zinc.

A native sulphate of zinc, or blende was discovered by Mr. W. Mainwaring in the Madura province, but whether the brown yellow, or black blende, Ainslie had not been able to learn.—*Ains. Mat. Med. p.* 58. Zinc is considered to have been known as a distinct metal only since the time of Paracelsus. It has long been imported from China into India. The name *Tutenague*, by which Chinese Zinc was known in commerce, is evidently derived from the Tamul, *tutanagum* (Essay Hind. Med. p. 100), and it was at one time called Indian Tin (*Stannum Indicum*). The ores of Zinc were no doubt employed by the ancients in making Brass. Zinc (Zn=32) is found in the state of an Oxide, but principally as a Sulphuret (*Blende*), and an impure Carbonate (*Calamine*). From both ores it is first converted into an Oxide by the process of roasting, and then reduced to the metallic form by the aid of Carbonaceous matter, when it may either be fused or sublimed. Until purified by a second distillation, it contains as impurities small portions of other metals, as Iron, Copper, Arsenic, &c.—*Royle.* In a broken boulder that a native brought to Tavoy, was a large vein of some ore, that was judged to be black blende, or black sulphuret of zinc. Mr. Mason, was never able however to ascertain the locality whence it was brought. Dr. Helfer reported the existence of ores of zinc on the Mergui Islands. He says: "The other ores discovered are of less importance. They are arsenic and zinc. The latter may contain some silver.—*Mason.*

(8787) ZINCI SULPHAS, L. E. D. Sulphate of Zinc. *Sal Vitrioli. White Vitriol.*

Schwefelsaures Zink-oxyd, Ger. | Sulphate de Zinc, Fr.

This salt is found native in some places. It is known in India by the name of *suffed loola*, or white vitriol. (*v.* p. 149.)

Prop. Sulphate of Zinc (Zn O, S O_3—7 Ap.=143) is a colourless salt, without odour, but having a disagreeable astringent and metallic taste.

(8788) ZINGIBERACEÆ, *Gingerworts*, a natural order of Endogenous Plants. The plants belonging to this order are herbaceous, possessing a creeping and often jointed rhizoma. Their stem is formed of the cohering basis of the leaves, and is never branched. The leaves are simple and sheathing, the blade being often separated from the sheath by a taper neck; they have a single midrib, from which diverge at an acute angle numerous simple crowded veins. The flowers are arranged in a dense spike or raceme, or a sort of panicle, which is either terminal or radical. The flowers are supplied with spathaceous membranous bracts, which usually lie in pairs. The calyx is superior, tubular, 3-lobed, short. The corolla is tubular, irregular, with six segments in two whorls; the outer whorl is 3-parted, nearly equal; the inner is also 3-parted, and represents three stamens, the intermediate segment is larger than the rest, and called the labellum, and is often 3-lobed; the lateral segment is sometimes nearly abortive. The stamens are three, distinct, of which the two lateral are abortive, and the intermediate one fertile; this is placed opposite the labellum, and arises from the base of the intermediate segment of the outer series of the corolla; the filament is not petaloid, and often extends itself beyond the anther in the shape of a lobed or entire appendage; the anther is 2-celled, and opens longitudinally, the lobes often embracing the upper part of the style. The pollen is light, granular, globose, and smooth. The ovary is 3-celled; the ovule attached to a placenta in the axis; the style filiform, and the stigma dilated and hollow. The fruit is usually a 3-celled capsule, and sometimes from abortion 1-celled. The seeds are roundish or regularly angled, and sometimes with an aril; the albumen flowery; the embryo enclosed within a peculiar membrane called Vitellus, and Membrane of the Amnios by Brown. This order of plants has been mostly placed with *Marantaceæ*. It was first constituted by Brown, who pointed out the difference between it and *Marantaceæ*. The distinguishing characters of *Zingiberaceæ* are—first, the structure of the seed, in which a fleshy body is interposed between the embryo and the albumen, entirely enveloping the former. This body is called Vitellus by Brown, and is the remains of the innermost integument of the ovule, which is unabsorbed during the progress of the seed to maturity. A second peculiarity consists in the 2-celled anthers; and with this structure is combined decidedly aromatic properties But the distinction between *Marantaceæ* and *Zingiberaceæ* depends, as pointed out by Lindley, on more important considerations than these. "In true *Zingiberaceæ*," he says, "as Brown has observed, the stamen is always placed opposite the labellum, or anterior division of the inner series of the corolla, and proceeds from the base of the posterior outer division; while the sterile stamens, when they exist, are stationed right and left of the labellum. But in *Marantaceæ* the fertile stamen is on one side of the labellum, occupying the place of one of the lateral sterile stamens of *Zingiberaceæ*. This peculiarity of arrangement indicates a higher degree of irregularity in *Marantaceæ* than in *Zingiberaceæ*, which also extends to the other parts of the flower." It contains 29 genera and 247 species. Nearly all the species are tropical plants, and by far the greater number inhabit various parts of the East Indies; they are also found in Africa and America. The plants belonging to this order possess great beauty, on account of the development of their floral envelopes and the rich colours of their bracts. They are also employed to a considerable extent in medicine and as condiments, on account of their aromatic stimulating properties. [CURCUMA; AMOMUM; ALPINIA.] *Zingiber* is known from the other genera by the inner limbs of the corolla having but one lip, and the anther having a simple recurved horn at the end.—*Eng. Cyc.*

(8789) ZINGIBER CASSUMMUNAR. YELLOW ZEDOARY.

Bun ada, HIND. and BENG.

Rhizoma much larger than that of common ginger, smell camphor-like, taste hot and bitterish (*Roxb. Fl. Ind* vol. i p. 49.) Now very little used.—*O'Shaughnessy, page* 643

(8790) ZINGIBER OFFICINALE. *Syn.* AMOMUM ZINGIBER, Linn. Narrow-leaved Ginger. Root —*O'Shaughnessy, page* 647.

Adrak, Ada, BENG. and HIND.

Zingiber Officinalis, the narrow-Leaved, or Common Ginger, has subsessile, linear-lanceolate, smooth leaves, elevated oblong spikes, acute bracts, and a 3-lobed lip. The root-stock of this plant is the ginger of commerce. It is imported into England from various quarters of the world, but more especially the East and West Indies. This plant is now grown in almost all parts of the globe in tropical climates, but it seems to have been originally indigenous in the East Indies. Ginger is one of the most agreeable of the hot aromatics, and is consequently much used as a condiment. It also enters into the composition of many medicines, where it acts as a carminative.—*Eng. Cyc.*

(8791) ZINGIBER ZERUMBET. *Syn.* AMOMUM ZERUMBET.

Butch. Mahaburee Butch, HIND. and BENG.

Found in the woods about Calcutta; the taste of the root resembles that of ginger, but is bitter as well as aromatic. It is not used in medicine by European practitioners.—*O'Shaughnessy, page* 648. *Zingiber Zerumbet*, the Broad-Leaved Ginger, is a native of the East Indies, and has delicate stems; bifarious, sessile lanceolate leaves; broad obovate bracts, and 3-lobed lip. This plant is much used in the East for cataplasms and fomentations, but is not taken internally.—*Eng. Cyc.*

(8792) ZINNIA, COMPOSITÆ. Zinnia elegans, alba, crocea and various others, may be all sown at the commencement of the rains, either separately or in beds. The flowers are pretty and ornamental, and require very little care : the seed as it falls, springs up immediately, and from its profusion, almost becomes a weed in the garden —*Riddell*.

(8793) ZIRA SUFAID. CUMINUM CYMINUM. CUMIN SEED. Plentiful about Ajmeer : much used in food and mesalihs.*—*Genl. Med. Top. p.* 153. See ZEERA.

(8794) ZIRCON. Some of the best of the Ceylon jewels are probably zircon, the pale variety of which supplies the diamonds used in the jeweling of watches; and Jameson says, it is often sold as an inferior kind of diamond.—*Mason*.

(8795) ZIRCON. HYACINTH, JARGOON. A Mineral occurring in attached, imbedded, and loose crystals. Primary form a square prism. Cleavage parallel to the lateral planes, indistinct. Fracture conchoidal, undulating, brilliant. Hardness, scratches quartz. Brittle. Colour white, gray, red, reddish brown, brownish-orange, yellow, pale-green ; streak white. Lustre adamantine. Doubly refractive in a high degree. Transparent ; translucent ; opaque. Specific gravity 4·505. Before the blow-pipe infusible, but loses its colour ; with borax fuses into a transparent glass. It is found at Expailly, in France ; Ceylon ; at Friedrichsuarn, Norway ; Greenland, the United States, &c. It contains—

Silica	33 3
Zirconia	66·7
	——100 *Eng. Cyc.*

(8796) ZIZYPHUS, Ζίζυφον, a genus of Plants belonging to the natural order *Rhamnaceæ*. It has a 5-cleft spreading calyx ; 5 obovate unguiculate convolute petals; pentagonal flat disc, expanded and adhering to the tube of the calyx ; a 2-3-celled ovary immersed in the disc ; the styles 2·3 : the fruit fleshy, containing a 1-2-celled nut; the seeds sessile, compressed, and very smooth. The species of this genus are shrubs, with alternate 3-nerved leaves, spiny stipules, and mucilaginous fruit, which is eatable. About 40 other species of *Zizyphus* have been described ; amongst them the Z. *lotus*, which is the Lotus of the ancients. [LOTUS.] Many of them are natives of the Himalayas. Wherever they grow, they produce a fruit which may be eaten with impunity, although it varies much in its grateful and nutritious properties. *Z. Napeca* grows in Ceylon ; *Z. xylophorus*, in Coromandel ; and *Z. Jujuba* in China yield edible fruits. Dr. Wight gives Zizyphus glabrata, 282 ; Jujuba, 99 ; and Rugosa, 839.

(8797) ZIZYPHUS GLABRATA. RHAMNEÆ Icon. 282.

Kurkutta wood, English. | Kurkutta marum TAM.

A moderate sized tree but the timber excellent, hard, close grained and taking an excellent polish. It is of a light brownish, colour, and trees are met with that would give a 12 inch plank —*Wight*.

(8798) ZIZYPHUS JUJUBA. *Syn.* RHAMNUS JUJUBA.

Vadari, SANS.
Usslie Suddir, ARAB.
Kool, BENG.
Yellanday marum, TAM.
Elanjee mara, CAN.
Gooly mara, CAN.
Ber, HIND.
Rega, TEL.
Hyee-bin. BURM.

The wild *Ber* tree, is common almost every where ; wood hard and useful, but of small size. It is used for making sandals. Wight No 127. Mysore 14, Bangalore 37.—*M.E.J.R. Ainslie.*

A small tree, a native of various parts of the East Indies and China, and common in gardens, where by grafting and cultivation it affords a large and very pleasant fruit called *Ber*. In Hindostan it is called *Berree* and *Jaree*, in Persia *Kinar* and *Kial*, in Arabia *Nebbek* and *Sidr*. Mr. Royle mentions that the fruit of the wild kind is dried and powdered, as was done with the lotus of the Lotophagi. This powder in Arabic is called *Suve koon nebek*, in Persian *Arud i kinar*, in Hindee *Ber choonee*. A lac insect inhabits the latter kind, and its produce is used for dyeing leather, cotton, and silk. The bark is used in the Moluccas as a remedy for diarrhœa ; the root with some warm seeds in infusion in fever. The lozenges, and thickened mucilage called *jujubes* by the confectioners, are prepared from this and the Z. vulgaris, a native of Syria, Persia, and Hindostan.—*Royle's Illustr.* p. 17. A variety with long fruit, described by Dr. Walich, is called in Bengal *Narikeli kool*.—*O'Shaughneesy, page* 273.

The Fruit.

Elandei pullum, TAM.
Boyrkapull, DUK.
Regoopundoo, TEL.
Unab, ARAB.
Budderie, SANS.

This is a pleasant tasted reddish colored fruit about the size of a large olive, but round. It grows in the woods and (*Ainslie*) is used in chatnies and pickles, being a very common tree in Madras. The Natives are very fond of the fruit when nearly ripe, it tastes like a Crab Apple. *Jaffrey.* The jujube from which the famous jujube lozenges are made, is this small sour berry, a great favorite with the Burmese and Karens. The tree is of middle stature, and is often found apparently growing wild.—*Mason*. This wood is used by the Natives for common purposes: it is that usually employed for making sandals —*Ains. Mat. Med p.* 207. Tree usually of small size, but the wood fine grained and hard, fitted for cabinet making purposes. Nalla Regu is occasionally brought down the Godavery and answers to this description, but the Z. Jujuba is understood to be the common *Regu*, or Hind *Ber*, of which natives make sandals.—*Rohde*. In Pegu,

Zizyphus Jujuba, is scarce, being only found near large towns, rarely in the Pegu and Toungboo forests ; dark-brown wood.—*McClelland*.

(8799) ZIZYPHUS LOTUS, a native of Africa. This is the tree celebrated in ancient poetry as the Arbor Lotophagorum, the fruits of which were said by Homer to be as sweet as honey, and when eaten to destroy the love of country. The fruits, Polybius states, constituted the staple food of the districts in which they grew, and also yielded a delicious wine.—*O'Shaughnessy, page* 272.

(8800) ZIZYPHUS NAPECA, Willd.

Tsoora pullum, TAMIL.

This fruit, says Ainslie, I have never seen, but am led to suppose that it has not much to recommend it. It grows in the woods, near the mountains.—*Ainslie, p.* 233.

(8801) ZIZYPHUS ŒNOPLIA. *Syn.* Z. NAPECA, Roxb. Flora Ind. i. p. 13.

Koattay marum, TAMIL.

Common all over India, fruit eaten by the natives, its taste being pleasantly acid. A decoction of the bark of the fresh root is said to promote the healing of recent wounds.—*Roxb. O'Shaughnessy, page* 273.

Specimens of this were brought as belonging to the class of timbers. But if used at all, it can only be for small ornamental work. There are several of the tribe used as timber in the Circars, that called *Nulla Regu* is a useful straight grained timber, well suited for ordinary furniture.—*Rohde.*

(8802) ZIZYPHUS SPINA-CHRISTI, Christs Thorn, has ovate-toothed smooth leaves, pubescent beneath; prickles twin, one straight, the other incurved; the peduncles, corymbose; the drupe ovate-globose. This plant is about eight feet high, and is a native of the north of Africa of Palestine, Ethiopia, and Egypt. The flowers are yellowish-green. The fruit is oblong, about the size of a sloe, and much eaten in Egypt and Arabia, This plant has pliant branches, and is covered with thorns; and being not uncommon in Palestine, has been supposed by Hasselquist to have afforded materials for the crown of thorns with which Our Lord Jesus Christ was crowned. The *Paliurus aculeatus* however is the more common thorny plant in that country.—*Eng. Cyc.*

(8803) ZIZYPHUS TRINERVUS, CAROOKOOVA LEAF, Rottl.

Carookoova elly, TAMIL | Vatadella, SANS.

The leaves of this species of Zizyphus have but little taste or smell. A decoction of them in conjunction with others of the same nature, is occasionally prescribed to purify the blood in cases of Cachexia, and in Venereal complaints of long standing. The Telingas call this tree Kakoopala.—*Ains. Mat. Med. p.* 76.

(8804) ZIZYPHUS VULGARIS.

Ber, HIND.

The Common Jujube, has ovate-refuse toothed smooth leaves; prickles absent or twin; and an ovate-oblong drupe. This plant is a native of Syria, whence it has been introduced into Europe. It is now cultivated in many parts of the south of Europe, where its fruit is known by the name of Jujube. It has yellow-greenish flowers, two or three of which grow together. The fruit is of a blood-red or saffron colour, and has a sweet granular pulp. In Italy and Spain it is eaten as a dessert when fresh, and in the winter season as a dry sweetmeat. It is also sold in great quantities in the markets of Constantinople. The Jujube is commonly planted by the Turks of Constantinople before their coffee-houses for the sake of its shade,—*Eng. Cyc.* In India, this is a common wild fruit tree, and grows in almost every jungle. The fruit is astringent, but sometimes of a pleasant subacid flavor—eaten chiefly by the poorer classes, and wild animals. It is more especially cultivated by Mussulmans round their tombs. The fruit is oblong, containing a stone, and bears twice in the year, the best crop about January: after this is over, the tree is pruned, by cutting off nearly all the smaller branches. A second crop succeeds on the new wood in the rains, but, from being full of maggots, is not eatable: even in the cold weather very few of the fruit are free from this insect. The natives pretend that they have a remedy, which prevents the fruit from being attacked, but, says Dr. Riddell, I have never known it succeed. The flavour is somewhat that of a fresh apple, and the fruit when large and fine is by no means to be despised. He succeeded best by budding from a good tree on a common stock raised from seed. It will bear well in two or three years, but requires care and watering at first. A fine gum-lac is produced from this tree; the cocoon of the wild silk worm is often found attached to it.—*Riddell.*

(8805) ZIZYPHUS XYLOPYRA, RHAMNEÆ.

Gotti, TEL.

A small thorny tree, fruit round, used by the moochies for blackening leather.—*Riddell.* It is common in every forest on the coast of Coromandel. In a good soil it grows to be a pretty large tree, with a tolerably erect trunk, but in general it is found in the state of a large straggling shrub. Cattle eat the leaves, young shoots, and fruit. The kernels taste like filberts, and are eaten by the natives. The wood of the largest trees is much esteemed by the natives, being yellowish or orange colored, very hard, and durable, and at the same time not very heavy.—*Rohde M.S.S.*

(8806) ZOANTHARIA. ('Animal Flower.' from the Greek ζῶον and ἄνθος), the third class of true Zoophytes, in the arrangement of De Blainville, and defined by him thus:—"Body regular, flower-shaped, more or less elongated, free or fixed, very contractile, furnished with an intestinal canal, without distinct walls, having a single large terminal opening surrounded by variously-shaped tentacula, which are always tubular and in communication with the musculo-cavernous parenchyma of the skin." The terms of this definition are in part incorrect, there being no intestinal canal properly so called, but a large bag-shaped stomach having distinct walls.

The *Zoantharia* may be grouped under four very natural families, namely:—

I. *Lucernariadæ*, the animals included in which are soft and simple, fixed by a small base or free, and having the tentacula in groups at regular distances on the margin of a campanulate disc, in the centre of which is the mouth.

II. *Actiniadæ*: animals all soft and simple, fixed or free; when fixed, adhering by a broad base; the tentacula in most species developed and surrounding the margin of the oral disc.

III. *Zoanthidæ*: animals coriaceous, simple or compound, fixed; tentacula marginal, surrounding the mouth.

IV. *Madreporidæ* (including the *Madrephylliæa* of D. Blainville: animals forming a solid calcareous polypidom; in other respects they resemble the *Actiniadæ*.—*Eng. Cyc.*

(8807) ZONURIDÆ, a family of Saurain Reptiles possessing the following characters:—Head pyramidal or depressed, covered with regular many-sided shields. Tongue flat, nicked at the tip. Scales of the back and tail large, rhombic. Sides with a distinct longitudinal fold, covered with small granular scales. Ears distinct. Eyes with two valvular lids. Limbs four, strong, or rarely entirely wanting or hid under the skin.

(8808) *Tachydromus sexlineatus*, the Tachydrome, is a tropical form of this family, and is found in Cochin-China, China, Borneo and Java.

(8809) ZOZYMUS (Leach), a genus of Brachyurous *Crustacea*, placed by M. Milne-Edwards in the division of Cryptopod Cancerians, between the genera *Carpilius* and *Lagostoma*.

Zozymus is hardly distinguishable except by the form of the claws, the extremity of which is enlarged and deeply hollowed out into a spoon-shape, a disposition which most influences the habits of the animal. It tends also, in his opinion, to establish the passage between the genera *Cancer* and *Xantho*; for he finds no character sufficiently precise to separate from it certain species, the general form of which is slightly less oval than that of the crabs properly so called, and the latero-posterior borders of whose carapace are nearly as long as the antero-posterior borders, which become strongly dentilated.—*Eng. Cyc.*

(8810) ZOZYMUS ÆNEUS has the carapace moderately large, convex, very unequal, strongly embossed, and nearly tuberculous at its posterior part; front slightly advanced and indistinctly divided into four lobes; latero-anterior borders of the carapace not prolonged beyond the level of the genital region, and armed with four very wide teeth, compressed and united after the manner of a crest; anterior feet tubercular externally; the succeeding feet hollowed with furrows on their external surface. Length from about 2 to 3 inches: colour yellowish with reddish spots. It is found in the Indian Ocean.—*Eng. Cyc.*

(8811) ZUR-DOZEE OR EMBROIDERY: (ZUR-DOZEE) is an art, in which the Mahomedans of India display a great degree of skill almost equal to that exhibited by the Hindoos in weaving. They embroider Cashmere Shawls and Scarfs, also Muslins, and Net fabrics with silk, gold and silver thread. These fabrics are much esteemed in Great Britain and are probably still unrivalled by similar productions in any part of the world.

Another branch of needle-work allied to embroidery, which is carried on there, is that of flowering or ornamenting Cloths with Cotton thread (Chickan-kavi.) The dresses of Mahomedans are frequently worked in this manner, and two descriptions of it called Tartor and Sumunderludur, in which the texture of the cloth is broken down with the needle, and converted into network, are held in the highest estimation.—*Dr. Taylor.*

(8812) ZURUMBAD.—Curcuma.—Zerumbet.—Zeodary; 4 sorts. See Huldee.

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Surgeon Madras Army, Officer in charge of the Government Central Museum, Madras; and Honarary Secretary Madras Exhibition of 1849.

Formerly, Honorary Secretary to the Madras Central Committee for the Great Exhibition held in London in 1851; Honorary Secretary Madras Exhibitions of 1855 and of 1857; and Secretary Madras Central Committee for the Universal Exposition held in Paris in 1855.

OPINIONS.

From the Madras Journal of Literature and Science, of the Madras Literary Society and Auxiliary Royal Asiatic Society.

(Vide p. 314 New Ser. Vol., ii. No, vi. Old Series, Vol. xviii. No. 43.)

" The Library of the Society has been furnished by Government with a copy of the *Cyclopædia of India and Eastern Asia*, By Edward Balfour, L. R. C. S. E., Surgeon, Madras Army. It is issued in Nos. of 100 pages each. Four Nos. have already appeared containing in all 2,755 words, which reach as far as C in the Alphabetical arrangement.

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Extract from the Minutes of Consultation of the Right Hon'ble the Governor of Madras in Council, under date the 18*th June,* No. 812, 1857.

The work offers to supply much useful information, and is in the opinion of Government, worthy of encouragement.

HE INFLUENCE EXERCISED BY TREES ON THE CLIMATE AND PRODUCTIVENESS OF A COUNTRY;

BY EDWARD BALFOUR, L. R. C. S. E.,

MADRAS, 1848. 8vo.

FROM SIR HENRY CONYNGHAM MONTGOMERY, BART., *Secretary to Government Fort St. George.*

Revenue Department, Fort St. George, 8th September, No. 982 *of* 1848.

To E. G. BALFOUR, Esq., *Assistant Surgeon.*

SIR,—I am directed by the Right Honorable the Governor in Council to acknowledge the receipt of your letter dated 31st March 1848, transmitting copy of Notes taken by you on the "Effect of Trees on the Climate and Productiveness of a Country. The Right Honorable the Governor in Council has perused with much pleasure and satisfaction the valuable and very interesting information contained in this paper, and in transmitting for your information the resolution passed on the occasion, desires to convey the thanks of this Government for your communication.

(Signed) H. C. MONTGOMERY, *Secretary to Government.*

Revenue Department, No. 981, Extract from the Minutes of Consultation, under date the 8th September 1848. Read the following letter from Assistant Surgeon Edward Balfour. (Here enter 31st March No. 701, 1848.)

Para 1. The Right Honorable the Governor in Council has perused with much pleasure and satisfaction the valuable and very interesting report furnished by Assistant Surgeon Balfour on the "Effect of Trees on the Climate and Productiveness of a Country, and deeming it of importance that the Local Revenue Officers should be in possession of information so intimately connected with the welfare of the Districts under their respective charges, he resolves to direct that copies of the same be printed at the Fort St. George Gazette Press for general distribution and for transmission to the Government of India and the Government of Bengal, Bombay, and Agra, and the Honorable the Court of Directors. * * * * The Governor in Council resolves to furnish to Assistant Surgeon Balfour a copy of the foregoing proceeding and to convey to him at the same time the thanks of Government for his interesting communication.

(Signed) H. C. MONTGOMERY, *Secretary to Government.*

Letter from Major (now Colonel) REID, C. B., *Secretary to the Madras Agri-Horticultural Society*; To the Secretary to the Board of Revenue.

3. The Committee are happy to have it in their power to forward a very ably written paper on this subject (*vide Printed Report already before the Government of India)* from the pen of Assistant Surgeon Edward Balfour of the 5th Regiment N. I. This document was originally intended by Mr. Balfour to have been sent direct to Government; but; changing his mind, he forwarded it to the Secretary of the Horticultural Society to be finally sent through them to its original destination. The Committee would beg the Board to bring this document to the especial notice of Government. * * *

(Signed) F. A. REID, *Secretary.*

STATISTICS OF CHOLERA,

BY EDWARD BALFOUR, L. R. C. S. E.,

MADRAS, 1849, 8vo.

Madras Medical Board, to Madras Government, in letter dated 9th August, No. 171, *of* 1849.

" By Assistant Surgeon Balfour of this establishment, and to state that, in the " opinion of the Board, the performance is highly creditable, and testifies to the ability and zeal of that officer; it is a paper in every point of view, well worthy of " publication."

Extract from the Minutes of Consultation of the Right Hon'ble the Governor of Madras in Council, dated 21st August, No. 3055 of 1849.

" Grants authority for printing the work by Assistant Surgeon Balfour submit- "ted with the foregoing letter." * * * "The Right Hon'ble the Governor in Council, notices the favourable testimony borne by the Medical Board, to Assistant Surgeon Balfour's ability and zeal."

The Hon'ble the Court of Directors in letter dated, 9th April No. 39, 1850. " These proceedings have our sanction. We notice with satisfaction the testimony borne to Assistant Surgeon Balfour's zeal and ability."

Lancet, London, April 20, 1850.

* * " As a contribution to the statistics of Cholera the pamphlet of Mr. Balfour is the most important work that has appeared for a long time."

Register General's Report on Cholera, London, 1852.—p. xcix.

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BY EDWARD BALFOUR, L. R. C. S. E.

From Madras Athenæum, January 16.

We have received a grateful present of a curious and pretty book. It is a collection of passages from the Hindostanee and Persian poets all in the Persian character, so long and so universally admired for its great beauty and engraved on richly ornamented pages. The origin of this fine volume is due to Dr. Balfour the Government Agent at Chepauk. Having for some years past, employed his leisure hours in collecting what appeared to him to be the finest passages in Eastern poetry, Dr. Balfour resolved to have the collection published in an Eastern style. He therefore gave copies of the verses which he had gathered to the Mussulman Syed Hoosain, known as "Koosh Navees," or "the beautiful writer," by whom they were copied into the elegant and flowing hand-writing of Persia. The whole work lithographed by the Hakeem Syed Mahomed consists of two hundred and fifty-two octavo pages, luxuriantly ornamented by two Hindoos, Rung Rajoo and Wakand Rajoo, after Mussulman fashion, with designs of flowers and fruits, and such other illustrations as a follower of the Arabian Prophet—forbidden to draw the likeness of any living creature, for fear of furnishing a hint or seduction to idolatry,—may indulge his pencil in pourtraying. Each page has its own distinct design and both the position and the space occupied by the writing, are regulated by the form and profuseness of these fanciful and beautiful illustrations. We have here then a pure specimen of Eastern ornamental writing, the designs being left to the taste of the writer and the ornamentors, lithographed by a Mussulman and bound up after Mussulman fashion. The title of the work is Gool-Dustah-i-Soohn, or "the Bouquet of Language." We learn that parties desirous of possessing themselves of copies of this volume, which is valuable both as a great curiosity and on account of its real merits as a work of art, will have an opportunity of supplying themselves at the *Athenæum* Office.

From Madras United Service Gazette, January 17,

We have been favoured by Dr. Balfour with a copy of his Selections from the Persian and Hindostani poets, being a collection of the finest passages in Eastern Poetry, compiled by this accomplished Orientalist in the course of his reading, and now published in a volume appropriately entitled Gooldusta-i-Sukhoon or the "Persian Anthology." The work does infinite credit to Dr. Balfour's taste as an Oriental Scholar. It is in the Persian character from the pen of Syed Husseiyn; known as "Khoosh Nuvees," lithographed by Syed Mahomed, the pages richly ornamented with Arabesques of infinitely varied design, and appropriately bound in the Mahomedan fashion. To Oriental Students we commend this volume of "Elegant Extracts," as such in the truest sense of the word, and acquaint them that it is procurable at the *Athenæum* Library.

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CONQUEST'S OUTLINES OF MIDWIFERY, IN DIGLOT HINDUSTANI AND ENGLISH, Madras, 1850.

BY EDWARD BALFOUR, L. R. C. S. E.

Persian and Hindustani Translator to Government.

Extract from the Minutes of Consultation, dated 13th June, No. 500 of 1850. Read the following letter from the Secretary to the Medical Board. Here enter 4th May 1850.

Para 1. The Right Honourable the Governor in Council observes that very favourable testimony is borne, both by the Council of Education in Bengal and by the Principal of the Delhi College, to the merits of Dr. Balfour's translation into Hindustani of Dr. Conquest's Outlines of Midwifery and * * * it is a work calculated to promote the extension of much useful knowledge among Hindustani students in an important branch of the Medical Department. * * *

True Extract. (Signed) H. C. Montgomery, *Chief Secretary.*

From the Secretary Council of Education (Bengal); To J. P. Grant, Esq., Secretary Government of Bengal, Fort William, 1st December 1849.

2. The Council are of opinion that the work would be most valuable to the Hindustani students of the Medical College and to the Native Doctors generally throughout the country, and beg strongly to recommend that it be published upon the terms mentioned by Dr. Balfour.

5. The Council are of opinion that great credit is due to Dr. Balfour for the ability with which he has executed a very difficult task. The diffusion of sound principles connected with the practical departments of medicine cannot fail to be most useful when made known in a vernacular language current among so large a portion of the population of Hindustan. All such attempts to be useful as that of Dr. Balfour are therefore deemed by the Council to be most deserving the patronage and encouragement of the Government of India. *Vide letter from the Secretary to the Council of Education of Bengal to the Secretary to the Government of Bengal, dated 1st December* 1849.

From Dr. A. Sprenger, Principal Delhi College, To F. J. Mouat, Esq., Secretary Council of Education.

" Considering that this is the first attempt of translating a work on Midwifery into Oordoo, the manner in which it is executed reflects the highest credit on Dr. Balfour. It is everywhere intelligible and many passages are elegant as far as the subject admits, and every friend of Native Education will be delighted to see so useful a book published." *Letter from Dr. A. Sprenger, Principal of the Delhi College to the Secretary to the Council of Education of Bengal, dated* 18*th October* 1849.

From Dr. F. J. Mouat, Secretary Council of Education, To J. P. Grant, Esq., Secretary to the Government of Bengal, Fort William, 4th February, No. 238, of 1850.

The difficulty of procuring such works may be estimated from the fact that although they have for some years been sanctioned by Government the only one in progress is the Manual of Anatomy by Dr. Mouat : a mere fragment of the Treatise on Medicine and Surgery having been prepared at Delhi.

(Signed) F. J. MOUAT, M. D., *Secretary Council of Education.*

From the Medical Board, Madras, in Letter from Dr. Lorimer, Secretary, dated 13th September 1852.

* * * Assistant Surgeon Balfour's Hindustani translation of Dr. Conquest's Midwifery, is a work which is highly creditable to him as a Medical Officer and a Hindustani scholar.

(Signed) A. LORIMER, *Secretary, Medical Board.*
FORT ST. GEORGE, 13*th September* 1852.

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MADRAS 1853.

The objects and aim of the above publication will be gathered from its preface. The publication of these Barometrical Sections has been undertaken with the hope of assisting the inquiries of the Geologist, the Engineer, and the Statesman, and it has been thought desirable to bring them into a connected form, for the benefit of the English public, by an outline of the physical features of this country and a short description of its Military and Civil divisions: an Index Map is likewise given to allow the eye to catch, at a glance, the different Sections in the volume. It is hoped that this outline may ultimately be filled in by detailed descriptions of Provinces, for the vast Empire of British India will not receive justice until the examination of its various features be undertaken on a scale commensurate with their magnitude. Its climate, and its Agricultural and Manufacturing Industries have had some attention paid to them, and a few scientific men have described parts of its animal, vegetable and mineral productions: but its geology, its flora and fauna, as a whole, have yet to be attended to, and its hydrography is a great want. No general description has ever been given of the many nations, races and wandering tribes that we rule over here, nor of their varied manners, their dwellings and physical character: nor of their languages, dress or food; though the value of any one, or all of these, if treated as a whole, would be inestimable, and it is to be hoped that, in addition to their immediate advantages, the Barometrical Sections may assist those who have leisure to undertake inquiries from which so much general benefit would result.

Proceedings of the Geographical Society, Bombay.

" It was remarked on Dr. Balfour's Barometric sections, which gave rise to these observations,—the Bombay Government having requested the opinion of the society as to their merits,—that they furnished a very valuble contribution to Physical Geography for which the Meteorologist and Geologist must feel most grateful. The Society were not in a postion to test their accuracy, but from the fame of Dr. Balfour, there could be no doubt that every precaution had been taken to render them correct."—Proceedings Bombay Geographical Society, of 21st, as published in *Bombay Times,* 27th, August 1856.

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THE LOCALITIES IN INDIA EXEMPT FROM CHOLERA,

BY EDWARD BALFOUR, L. R. C. S. E.

MADRAS, 1856.

From the Witness, Edinburgh, Wednesday, December 3, 1856.

Dr. Balfour, an able Surgeon at Madras, has just published a curious volume of Reports on Cholera. He started some years ago a theory that there were many places absolutely exempt from the scourge. Investigation has confirmed this opinion. In Madras alone there are thousands of villages which have never felt the visitation, though surrounded by infected districts. Minute lists are supplied and each place is to be separately examined.

* * *

From the Friend of India.

We require, however, further facts and it is to their collection that the attention of Doctors and Statists all over the earth should be directed. One volume of such data has reached our hands. It has been prepared by Dr. Balfour of Madras, one of the Surgeons who show us what the Company's Service under favourable circumstances might become. With an industry none the less creditable from the sameness of the task, he has hunted up the facts of the case from every Zillah of his own Presidency. Mysore furnishes a most valuable mass of statistics, and even Scinde and the Dekhan contribute a few figures not without their value. We have not space or indeed time to condense the mass of tables furnished by Dr. Balfour, but * * * the enquiry is of the highest importance and the Madras Government would confer a benefit on humanity by enabling Dr. Balfour to devote himself to this especial end.

From the *Fort St. George Gazette*, No. 3055, Dated 5th September 1856 p. 339.

The following Notification is published for the information of the Authorities concerned.

NOTIFICATION.

Deeming the investigation into the remote and proximate causes of Cholera, upon which Dr. Balfour is engaged, to be one of great interest and importance, the Right Honorable the Governor in Council is pleased to direct that all Civil, Political, Military and Medical authorities will afford to that Officer every assistance in their power, and supply him with such information as he may seek in the prosecution of his enquiries.

By order of the Right Honorable the Governor in Council.

(Signed) T. Pycroft, *Chief Secretary.*

From the Bombay Times.

A very interesting work has just been published by Dr. Balfour of the Madras Army, on the Localities in India exempt from Cholera, and this forms an element for an addition to our physical Atlases, we were not prepared for. A set of cholera or pestilence maps for India * * * would bring under the eye at once in graphic form the vast mass of facts here appearing as statistics. * * Dr. Balfour does not confine himself to dry Tables or abstracts; but gives in his narrative an account of the geological and other leading features of the country.. * * The work is one of the many Dr. Balfour has given to the world where the mass of printed matter affords a very inadequate idea of the amount of labour expended on its preparation for the press, or the very great value of the facts comprised within the narrowest limits that can be assigned to them.

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Revenue Board, Fort St. George, Revenue Consultation No. 54 *of 2nd June* 1857.

* * The paper compiled by Dr. Balfour will be a useful record for reference in the offices of the Board and the several Maritime Collectors. * * The arrangement adopted by Dr. Balfour is clear and precise. * * *

From the Madras Athenæum.

An unpretending publication has just been issued from the Scotch Mission Press, containing in a small compass, much information of interest to all whose pursuits require them to know in what the commercial wealth of this country consists. Styled "the commercial products of the Madras Presidency, as shown by its Exports and Imports, their quantities and values, for the four years 1852-53, to 1855-56 inclusive," it gives in detail every article of Export and Import forming the trade of the whole Madras Presidency. The value, of the total exports for that period, we observe, stated at Rs. 14,32,93,799 and that of the Imports at Rs. 11,35,20,461. * * * These are some of the thoughts which have occurred to us from a hasty glance at these Commercial Tables, which we received yesterday; we will refer to them again at leisure, as the matter they contain is of great general importance. * * We consider they supply a general want which we ourselves have often felt.—*Madras Athenæum, March* 3, 1857.

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